Bureau of Land Management
California Desert District

PROGRAMMATIC ENVIRONMENTAL ASSESSMENT (PEA)

ABANDONED MINE LANDS (AML) REMEDIATION AND CLOSURE PROCESS

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Programmatic Environmental Assessment:

Abandoned Mine Lands Remediation Closure Techniques for Mine Shafts and Adits

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LIST OF ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
AML	abandoned mine lands
BCI	Bat Conservation International
BLM	Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CDCA	California Desert Conservation Area
CDD	California Desert District
CEPA	California Environmental Protection Agency
CEQ	Council on Environmental Quality
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CMP	Coordinated Management Plan
CNPS	California Native Plant Society
CWA	Clean Water Act
CX	Categorical Exclusion
dBA	A-weighted decibel level
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
DPS	Distinct Population Segment
DWMA	Desert Wildlife Management Area
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
°F	Fahrenheit
FEIS	Final Environmental Impact Statement
FICC	Federal Interagency Communications Center
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
MSHA	Mine Safety and Health Administration
MUC	Multiple Use Class
MWD	Metropolitan Water District
NAAQS	National Ambient Air Quality Standards
NECO	Northern and Eastern Colorado Desert Plan
NEMO	Northern and Eastern Mojave Desert Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
nPA	national Programmatic Agreement
NRHP	National Register of Historic Places
O_3	ozone
OHV	Off-Highway-Vehicle
OIG	Office of the Inspector General
PEA	Programmatic Environmental Assessment
PFYC	Probable Fossil Yield Classification
PM_{10}	Particulate matter less than 10 microns in size
PUF	polyurethane foam
RMP	resource management plan
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan (air quality)

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

THPO	Tribal Historic Preservation Officer
U.S.	United States
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOCs	Volatile Organic Compounds
VRI	Visual Resource Inventory
VRM	Visual Resource Management
VRP	visibility reducing particles
WECO	Western Colorado Desert Coordinated Management Plan
WSA	Wilderness Study Area

1.0 INTRODUCTION

Over one hundred years of mining has resulted in thousands of abandoned mine lands (AML) in the Mojave and Colorado Desert regions in Southern California. The AML structures and mining-related features (Appendix A) on these lands present an ongoing threat to public safety because of lack of maintenance, poor or no ventilation, and other hazards. The mine openings, historic appeal, and anticipation of discovery associated with these AML features makes them an attractive nuisance because they often lure inquisitive members of the public who are unaware of, or disregard, the dangers posed by these safety hazards. For example, members of the public visiting the California desert have accidently entered AML features or knowingly entered to explore the mines. However, because AML features are generally no longer maintained a variety of hazards exist and people may become lost within an abandoned mine or may become injured in and around these areas. The increased incidence of injuries and deaths associated with abandoned mines, associated with increasing population and changing recreational use patterns in the Bureau of Land Management's (BLM) California Desert District (CDD), results in an increased need for the BLM to address closure and remediation of these features on public lands.

The State of California AML Unit estimates that there are approximately 39,000 abandoned and inactive mine sites in California. Approximately 48 percent of these abandoned and inactive mines occur on federal lands. In a review of United States Geological Survey (USGS) Quadrangle maps, the California AML Unit identified over 13,000 mine symbols within the CDD (Appendix B, Figure B-1). Field verification of a sampling of these sites revealed that the mine symbols generally under-represent the number of AML in the area by a factor of four.

In 2008, the Office of the Inspector General (OIG) published the *Abandoned Mine Lands in the Department of Interior* (DOI) report and noted that "public safety is at risk because physical and environmental hazards at abandoned mine lands have been ignored by the DOI for decades." Between 1999 and 2007, 33 AML-related fatalities were recorded by the United States (U.S.) Mine Safety and Health Administration (MSHA) on public and private lands in the western U.S. The OIG audit concluded that the DOI needs to establish "a firm commitment to protect the public, sustained funding, and dedicated staff" with respect to its AML programs (OIG 2007).

As a bureau of the DOI, the BLM is committed to addressing the findings and implementing the recommendations of the OIG. As a result of the OIG assessment, the BLM has taken a number of steps to build a comprehensive and aggressive AML program. These steps include: 1) initiation of a new AML Strategic Plan for the CDD; 2) implementation of "Fix a Shaft Today," a voluntary inventory and safety closure program; and 3) development of guidance to encourage increased stakeholder involvement and improved coordination with AML partners at the federal, state, and local level. The BLM is also evaluating the remediation and closure process analyzed in this PEA as an additional part of the overall AML program.

The BLM's involvement in this remediation and closure process will require the agency to make and implement decisions regarding methods for remediating public health and safety concerns by closing AML. As a federal agency, BLM's involvement in these activities triggers the requirements of the National Environmental Policy Act of 1969 (NEPA), which requires federal agencies to evaluate the potential impact of proposed major federal actions and consider such impacts during the decision-making process. This Programmatic Environmental Assessment (PEA) has been developed in accordance with NEPA, its implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508), and the BLM NEPA Handbook (H-1790-1). This PEA evaluates the direct, indirect, and cumulative impacts of the BLM's proposed CDD AML

remediation and closure process. This process provides a framework that allows the BLM CDD to identify mining features presenting hazards to public safety and to identify the appropriate remediation and closure techniques to eliminate the safety concern, while also considering potential environmental and cultural resource impacts. Where site-specific concerns or potential solutions are identified which are outside of the scope of issues evaluated within this PEA (such as for a site with extensive environmental and/or cultural resources that would be impacted by closure activities), a separate, site-specific environmental assessment tiered from this PEA may be developed to ensure all environmental and cultural resource impacts are thoroughly evaluated.

1.1 NEED FOR THE PROPOSED ACTIONS

The purpose of the BLM CDD AML remediation and closure program is to do the following:

- Establish a step-wise, comprehensive process for remediation and closure of AML features presenting public health and safety concerns;
- Determine the appropriate site-specific remediation and closure techniques for each AML feature;
- Address previously identified public safety hazards associated with AML features; and
- Ensure that proposed remediation and closure techniques are implemented in such a way as to minimize potential environmental and cultural resource impacts.

Hazardous AML features, including shafts, adits, pits, and trenches (Appendix A) pose a safety concern throughout the CDD. Abandoned mines are hazardous because they: 1) are no longer maintained; 2) may lack ventilation; 3) may collapse due to age and instability; 4) may contain vertical shafts that are hidden under debris; and 5) may pose other physical safety hazards. People may become lost within an abandoned mine or may become injured in and around these areas. The increased incidence of injuries and deaths associated with abandoned mines results in an increased need for the BLM to address remediation and closure of these features on public lands.

Remediation and closure of the AML sites must balance the need for protecting humans from the dangers associated with the features along with the potential need to: 1) allow for the continued use of mines that provide functional habitat for desert species; 2) allow for continued use of mines that may have future production potential; and 3) preserve significant environmental, historical, and cultural resources.

1.2 SCOPE OF THE PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

Although an Environmental Impact Statement (EIS) or Environmental Assessment (EA) may be required for an individual action by a federal agency, where federal programs involve a multiplicity of individual actions, the Council on Environmental Quality (CEQ) has endorsed the concept of performing programmatic analysis or "tiering." The CEQ NEPA regulations encourage agencies to prepare "tiered" environmental analyses to assist in the evaluation of a large-scale program or project involving a series of related decisions. Programmatic environmental reviews, such as this PEA, may cover basic policy issues so that these issues do not need to be repeated in subsequent NEPA analyses prepared for the individual actions within a program. Also, programmatic environmental reviews promote consideration of cumulative environmental impacts that might be ignored in assessments prepared on a case-by-case basis (Sigal and Webb 1989).

The BLM has determined that a "comprehensive and programmatic" PEA is the appropriate document for assessing the AML remediation and closure process. The intent of the PEA is to:

- Identify those elements of mine feature remediation and closure that are common to all potential remediation and closure actions;
- Identify common impacts and mitigation measures to assure that mine closures or remediation can be completed in the most efficient and expedient manner; and
- Streamline and expedite the review and assessment process through a common set of environmentally acceptable protocols and mitigation.

Where site-specific concerns are identified which were not considered in this PEA, such as for a site with unique environmental or cultural considerations, a separate site-specific environmental assessment that is tiered from this PEA may be developed to ensure all environmental and cultural resource impacts are thoroughly evaluated for each AML site subject to remediation and closure. For example, site-specific reviews may be conducted at sites where there are significant structural mining remains that would potentially be significantly impacted by implementation of the potential closure methods evaluated in this PEA.

1.3 REGULATORY COMPLIANCE

Remediation or elimination of these AML features that present a hazard to public health and safety is consistent with section 302(b) of the Federal Land Policy and Management Act (FLPMA) of 1976 (43 United States Code [USC] 1701, 1743). The BLM has a fiduciary responsibility to remediate situations that are creating a public or environmental hazard. The AML remediation and closure program is consistent with congressional direction regarding the BLM's management of public lands and resources.

The project alternatives analyzed in this PEA would be subject to all applicable federal, state, and local laws and regulations including:

- Abandoned Mine Land Program Policy Handbook (BLM Manual 3720)
- Washington Office Instruction Memorandum 2005-231 – Identification of Hazardous Sites Near Populated and High-Use Areas
- Clean Water Act (CWA) of 1972
- Clean Air Act (CAA) of 1995 (40 CFR Part 93 subpart W)
- BLM Manual 7300 (2009)
- National Environmental Policy Act of 1969 and 40 CFR 1500-1508
- Endangered Species Act of 1973 as amended
- Migratory Bird Treaty Act of 1918
- Executive Order No. 11514, Protection and Enhancement of Environmental Quality of 1970
- Federal Land Policy And Management Act of 1976 and 43 CFR 1600 regulations
- BLM Manual 6840 of 2008
- BLM Manual 6500 of 2004
- Memorandum of Understanding Between the BLM CDD and Bat Conservation International, 2009
- CA Handbook 6840-1 of 1996, as amended by CA IM 2009-0026
- California Desert Native Plant Act of 1977, Section 80001-80006
- The National Historic Preservation Act of 1966 (NHPA) and 36 CFR 800 regulations

- American Indian Religious Freedom Act of 1978, 1994 as amended
- Religious Freedom Restoration Act of 1988, and 1993 as amended
- Native American Graves Protection and Repatriation Act of 1990
- Archaeological Resources Protection Act of 1979
- California Endangered Species Act (CESA) of 1970

1.4 CALIFORNIA DESERT DISTRICT (CDD)

The BLM's CDD was created to protect the natural, historic, recreational, and economic riches of the diverse and scenic California desert. In 1976, the United States Congress designated 26 million acres in southern California as the California Desert Conservation Area (CDCA), which covers nearly one quarter of the state. The BLM, through the CDD, acts as a steward for 10.4 million acres of this 26 million acre multiple use area. In addition to the lands under the CDCA, the CDD also manages 300,000 acres of scattered parcels in Kern, Inyo, Los Angeles, Riverside, San Bernardino, Orange, Imperial and San Diego counties. The district is divided into five resource areas, administered by Field Offices in Ridgecrest, Palm Springs/South Coast, El Centro, Barstow and Needles (Appendix B, Figure B-1).

1.5 LAND USE AND RESOURCE MANAGEMENT COMPLIANCE

The AML process evaluated under this PEA includes sites located on all lands managed by the BLM CDD Office with the support of the Ridgecrest, Palm Springs-South Coast, El Centro, Barstow, and Needles Field Offices. This evaluation process includes public land within the CDCA, as well as 300,000 additional acres that are not included within the CDCA (Appendix B, Figure B-2).

In accordance with BLM planning regulations (43 CFR 1610.5-3), the proposed actions in this PEA were evaluated for compliance with existing land use and resource management plans (RMP) for relevant portions of the project area. While all existing land use plans and RMPs in the CDD require that the BLM manage public lands to prevent undue or unnecessary degradation to public lands and resources, none of these plans specifically address AML features as an issue affecting public land management. This PEA incorporates, by reference, the following RMPs and land use management plans:

- CDCA Plan of 1980, as amended
    - West Mojave Plan Amendment;
    - Northern and Eastern Mojave (NEMO) Management Plan Amendment;
    - Western Colorado (WECO) Off-Highway Vehicle (OHV) Routes of Travel Designation Plan Amendment;
    - Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) Amendment;
    - Coachella Valley Plan Amendment;
- South Coast RMP of 1994; and
- Eastern San Diego County RMP of 2007.

The affected environment, cumulative effects, and recreation sections of these documents provide background information about the project area, land use, and environmental impacts issues associated with implementation of this AML remediation and closure process.

The majority of the AML addressed under this PEA are located in the CDCA and are managed in accordance with the CDCA Plan of 1980, as amended. The proposed actions evaluated in this PEA support two goals of the CDCA: 1) to provide a safe recreation environment; and 2) to avoid impacts on wildlife populations (BLM 1980).

Other AML included within this remediation and closure process, but that are outside of the CDCA are subject to the South Coast and Eastern San Diego County RMPs. The proposed actions evaluated in this PEA are in compliance with both the South Coast and Eastern San Diego County RMPs. These RMPs include provisions that show awareness for the conservation of resources (BLM 1994, BLM 2007).

1.6 PUBLIC AND AGENCY INVOLVEMENT

In accordance with the public participation provisions of NEPA (42 USC 4321 et seq.), NHPA (Public Law 89-665; 16 U.S.C. 470 et seq., as provided for in 36 CFR 800.2(d)(3)), and other laws and policies requiring public involvement, public participation was a critical element in development of this PEA. The public and interested stakeholders assisted the BLM in determining the scope of analysis in the PEA and identifying potential impacts associated with the proposed actions and project alternatives. This input aids the decision-making process for determining the outcome of this PEA, which will be either a Finding of No Significant Impact (FONSI) or a recommendation to complete an EIS.

To formally solicit public input, the public scoping period began with a BLM-California news release announcing the PEA effort on 21 April 2009. Concurrently, letters announcing two public scoping meetings were sent to several thousand addresses in the CDD interested parties list; 45 certified letters were mailed to Tribal Governments; and 2208 letters were mailed to mining claimants. The initiation of the PEA effort was also announced on CDD's external webpage (http://www.blm.gov/ca/st/en/info/newsroom/2009/april/CDD0941_AML_PEA.html).

In May 2009, the BLM conducted two public meetings to encourage questions, comments, and input from public stakeholders with respect to the PEA. The first meeting was held on May 27, 2009 in Ridgecrest, California. A second meeting was held on May 29, 2009 in Yucca Valley. Approximately 60 members of the public attended the meetings.

During these meetings, BLM representatives presented information about the PEA process, the goals of this PEA, and the proposed actions under consideration. The proposed alternatives under consideration were also described. Additionally, BLM representatives gathered public stakeholder input, discussed public stakeholder comments, and answered public stakeholders' questions. The primary concerns expressed by the stakeholders during these meetings were: the way the NEPA process works with respect to this project, the choice of a PEA versus an EA, the purpose and need, the project alternatives, the impact analysis (with specific concerns about bats, bighorn sheep, water quality, and preservation of future potential mining development), clarification on the scope of sites to be included in the PEA, education of public safety issues at AML, use of gates at shafts and adits, closure techniques, remediation techniques, and monitoring and maintenance. Some comments addressed issues pertinent to mining sites in the CDD but were outside the scope of the PEA including questions about mining claimant's responsibilities and the financial costs of the program.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Identifying and analyzing alternatives is an important part of the NEPA decision making process. As part of the alternatives analysis, a range of preliminary alternatives are identified. These alternatives are then screened against the project purpose and need as well as other screening criteria. Through this process, some alternatives are eliminated from further consideration and the remaining alternatives are studied in detail as part of the NEPA review process.

2.1 NO ACTION ALTERNATIVE

Under the no action alternative, present management policies would continue with respect to public safety risks associated with AML. Current policy is to perform mine closures on an emergency basis with priorities established by public safety incidents. An assessment team visits the site, and prepares a Categorical Exclusion (CX) determination under NEPA. The team implements the closure process without a significant review of potential environmental impacts or consideration of treatment measures to avoid, minimize, or mitigate potential impacts. Under the no action alternative, mines closed under non-emergency circumstances would require individual NEPA EAs for each separate action, a process that would require, at a minimum, several months per feature.

2.2 PROPOSED ACTION

The Proposed Action is for BLM to establish and implement a step-by-step, comprehensive assessment and closure process to remediate dangers to public health and safety associated with AML located on land managed by the CDD. Eligible AML sites would be determined in a separate identification process (Appendix C) and would be limited to AML sites that are inactive with no Plan of Operation or bond, un-claimed AML sites, and AML sites that have no associated potentially responsible party.

The comprehensive remediation and closure process would include consideration and evaluation of potential environmental impacts to the environment and cultural resources associated with the installation of possible closure techniques. The CDD AML remediation and closure process would include the following steps:

1. Establish the Evaluation Team
2. Determine the Site Accessibility
3. Conduct the Site Assessment
4. Develop the Remediation Plan
5. Implement the Remediation Actions
6. Perform Project Closure and Monitoring

2.2.1 Establish the Evaluation Team

Once the BLM has determined that a feature poses a threat to public health and safety, the CDD AML remediation and closure process would begin with identification of an interdisciplinary evaluation team. The evaluation team would be responsible for the following: 1) identifying the site access plan and determining the routes to be used, 2) conducting environmental and cultural resources site surveys at the AML features and along access routes, 3) developing recommendations for the remediation and closure methods to be employed at each AML site; 4) completing all regulatory compliance documentation, 5) performing post-closure inspection, and 6) performing post-closure long-term monitoring. The evaluation team would consist of, at a

minimum, a remediation specialist, an engineer, a geologist, an archeologist, a wildlife specialist, a fire specialist, and/or contractors hired specifically for this purpose. Other specialized team members may participate in the decision making process depending on the proximity of the feature(s) being remediated to wilderness, designated recreation areas, leased lands, or lands with other significant resource values.

2.2.2 **Determine the Site Accessibility**

The evaluation team would begin the site assessment with an evaluation of the site's accessibility. All remediation actions would require the movement of supplies, equipment, and people to the site. Access routes to reach AML are varied and site-specific. For some AML sites, access may be readily available along existing state and local roadways. Other sites may require helicopter access. Access to some sites may require vehicles to travel very short distances of less than 100 feet off an existing route. Additional off-route travel beginning from an existing route that is designated open may be allowed under the stopping, parking, camping restrictions of the land use plan that governs that open route. Generally this distance is zero to 300 feet. Some sites may require minor road leveling of closed routes (which would be restored to its original condition after use) to allow personnel and equipment to access the AML feature.

All existing routes accessing the project area would be evaluated to determine the best pathway that allows access and minimizes resource impacts. For example, if the closest route is returning to a natural state and a longer route is more frequently used, it may result in a lower environmental impact to use the latter. In some cases, a route that has been designated as closed to public use may be used by the BLM for administrative or emergency management purposes, including the remediation of abandoned mines. The condition of the proposed route(s) would be analyzed to ensure suitability for the type of vehicles and equipment proposed for the project. Additionally, the route would be restored to its previous condition upon completion of the project.

If adequate vehicular access is not available, use of pack animals or walking pathways to move materials and supplies to the mine feature would be utilized. In rare instances when a helicopter is used, several trips may be required to deliver the workers and materials to the project site and again afterwards to remove tools, trash, and any remaining unused items once the project is completed. Helicopters do not require landing at the site. Equipment and supplies can be slung into an area and dropped without helicopter occupation of the surface.

The evaluation team would document in the Remediation Plan the best access route(s) for the mine feature being evaluated. This evaluation would be based on road classification status (for example open, closed, or limited access), road condition, whether leveling prior to site activities and/or restoration following site remediation would be required, and whether the location is within a protected area that requires implementation of specific transportation procedures. If open routes are not present or are of special concern, during the site assessment process BLM would evaluate the need for and potentially conduct physical, biological, and cultural resources surveys along the potential transit areas to determine existing conditions and access potential impacts associated with any necessary leveling and the movement of personnel and construction equipment. When necessary, specific transportation guidelines would be developed for use during the site assessment, remediation, and closure steps. All access routes and activities associated with use of these routes would be detailed in the Remediation Plan.

2.2.3 **Conduct the Site Assessment**

Once the BLM has identified that access is available, the evaluation team would begin with a site-specific evaluation of the AML site. The site-specific site assessment would be conducted in three parts: 1) desktop and field surveys, 2) development of recommendations, and 3) regulatory compliance. For the initial site assessment, the evaluation team would identify existing resources and potential impacts to these resources at the AML site and along the transportation pathways. Research including desktop review of existing surveys and data, and implementation of internal and/or external site-specific field surveys would be used. Following the completion of the surveys, the evaluation team would recommend a site-specific remediation and closure method, and appropriate site-specific mitigation measures that may reduce potential impacts to the site-specific resources.

Complete evaluation of existing resources may include a combination of external (entrance and surrounding area) and internal (in-mine) surveys.

External Surveys

External surveys would be used to evaluate the environmental and cultural resources present at the mine entrance and in the surrounding area. External surveys would include the entire area of disturbance, including the transportation and maneuvering areas utilized for access; and material storage, staging, and borrow areas as applicable. Where significant resources are identified, the evaluation team would develop a treatment plan to avoid, minimize, or mitigate adverse effects to the resources. Three types of external surveys would be conducted at each site:

1. Physical resource surveys to determine the nature of the physical environment including the geology and soils, evaluate the environmental setting with respect to designated Wilderness and Wilderness Study Areas (WSAs) or Areas of Critical Environmental Concern (ACECs), and characterize the condition of the mine and mineral resources;
2. Cultural resources surveys to determine the presence of existing or potential for undiscovered archaeological or historical resources;
3. Biological resource surveys to characterize the flora and fauna present, identify potential habitats and wetland areas, and identify the presence of any threatened or endangered species;
4. Visual resource surveys to characterize the visual setting.

Many AML features are man-made underground workings which may be adopted as roosting places for bat colonies or as shelters for other species. The potential remediation and closure techniques may limit the ability of wildlife to access these mines. Therefore, it is essential to characterize these mines on a site by site basis for the potential of each to host bat colonies or for use by other species, especially threatened and endangered species. Based on existing information, it is likely that a large number of features are used on a regular basis by a variety of bat species. Therefore, the AML process would include specific provisions to determine the presence of bat colonies and select appropriate closure methods with respect to these colonies.

External bat surveys may be required where internal surveys are not safe, feasible, or permitted by authorities. Such surveys may also be required if no evidence of bats is apparent during an internal survey, but the mine has potentially important inaccessible areas (e.g., large stopes or

dangerous shafts). External bat surveys would consist of positioning personnel where they can observe bats exiting and/or entering the mine during the night. Observations may be made with night vision, infrared cameras/recorders, or a variety of other tools. The use of red lights would be avoided, as some bat species are sensitive to this wavelength. With care, external surveys are potentially safer for personnel, and less disturbing to bats than internal surveys. However, external surveys are far less efficient and more labor intensive. Bat use may be documented by a single survey if the animals are actually observed. However, determining that a site is not used by bats can only be inferred after repeated surveys where no animals or signs were detected. Many bat species routinely switch between suitable roosting sites or move to different roosts throughout the summer. As a result, the timing and frequency of external surveys is crucial to understanding how bats use particular roost sites to avoid a false conclusion that a site is not used.

Internal Surveys

Mines potentially containing bat colonies may require an internal survey if site conditions make it safe and feasible to conduct. An internal survey is a thorough visual inspection for potential roosting surfaces within the mine for resident bats or evidence of their presence (guano, urine staining, odor, insect parts, and social calls or other acoustic indications). Internal surveys are extremely dangerous and require extensive preparations and safety precautions. BLM representatives entering an abandoned mine must have the appropriate training, experience, and approvals. However, when properly conducted, internal surveys are reliable and a more efficient survey type for evaluating abandoned mines as bat roosts. Generally, if bat use of a mine is significant, bats or evidence of bats would be encountered well before the entire mine has been evaluated.

2.2.4 Develop the Remediation Plan

Utilizing the information from the accessibility assessment, external surveys, and internal surveys, the evaluation team would develop recommendations for the site-specific remediation and closure method to be employed at each AML feature. Site-specific remediation and closure methods would be selected to eliminate the site-specific hazards while also avoiding or reducing potential impacts to environmental and cultural resources. The evaluation team would include recommendations for mitigation measures to avoid and minimize potential impacts. Remediation actions would typically only involve the area of the footprint of the mine feature. Potential remediation activities include:

1. Fencing
2. Filling
    a. Backfilling
    b. Polyurethane Foam (PUF) Plug
    c. Blasting
3. Installation of Gates, Cupolas, Culverts, or Grates

Warning signs may be incorporated with any or all remediation and closure methods. Such signs are designed and installed following the BLM's sign policy. All signs have high contrast lettering, are reflective or contain reflective materials such as reflective stickers.

2.2.4.1 Method I: Fences

Fences may be constructed to provide management boundaries around an AML feature (Photo 1). The purpose of fencing is to increase safety by alerting the public to potentially hazardous underground mine workings and preventing or deterring the entrance into such features. Fencing in areas with notable OHV use is also intended to alert riders to the hazard. These fences would be noticeable from a distance.

Photo 1. Smooth four-wire fence with signs (photo by Sterling White 2009)

Fences are also designed to be a safety boundary for biological species, as appropriate for the location and land use. In some cases, it may be beneficial to also use exclusion fencing to prevent wildlife access to hazardous features.

Because mine features vary in size (Appendix A), fence design is highly variable. Wire may be smooth, mesh, or combined, and may be used dependent on the purpose of the limiting access. Generally, steel line posts are spaced a maximum of 16.5 feet apart. All fences include warning sign(s), which are posted to make the public aware of the hazardous conditions.

Four sample fencing types are shown in Appendix D (Figures D-1 through D-4).

2.2.4.2 Method II: Filling a Mine Feature

This activity would consist of placing material into the mine feature, such as an adit, shaft, pit, or trench. The purpose is to provide a complete and permanent closure with no future access to the feature.

Backfill

Backfilling is the most permanent means of blocking all access to a hazardous feature (Photo 2 and Appendix D Figure D-5). The mine feature would be filled entirely with earthen backfill/waste rock material, concrete, and/or native stone, and may be covered with soil material to facilitate revegetation (if required). Earthen material, including soil and stone, would be selected that blends in with the surrounding landscape. The material used would be free of cultural resources, non-native plant species and their seeds, and contamination.

Photo 2. Dozer backfilling a shaft (photo by R. Masner 2007)

Fill material is compacted to eliminate or minimize surface subsidence as needed, depending on the selected material. This compaction is useful with small diameter and relatively "shallow" shafts including small adits or when the feature bottom is not far from the surface.

Some mine features may be filled manually with the use of a shovel. This method may be desirable for smaller mine features, when a mine feature does not have a nearby vehicular and/or heavy equipment access route, or if there are biological or cultural resources that are hard to avoid with a vehicle or heavy equipment. This method would be preferred for sites in Wilderness and WSAs.

For larger mine features with vehicular access, earth moving equipment including tractors, bulldozers, grading equipment, and trucks with grading equipment attached may be used. To the extent possible all biological and cultural resources identified during the site assessment would be avoided during the project and recommended mitigation measures enacted. Any area affected by off-route travel or travel on a route that was not designated as open, would be reclaimed by raking and physically removing vehicle tracks.

In a typical backfill operation, a piece of heavy equipment excavates material from a borrow site and transports and dumps the fill material into the feature. Bulldozers or front loaders would be used to push material directly into a feature (shaft) or up into or adjacent feature opening (adit, tunnel). Where the feature is located in an area of having high sensitivity to surface disturbance, an excavator would be used to place material directly into the feature to be closed.

The borrow site is typically located in an area where waste rock has been deposited. This operation would result in further reclamation of the site to the natural state by reusing the excavated material to refill the mine. Fill material would primarily be taken from facilities consistent with the conclusions of the Remediation Plan. If no such site is readily accessible or available, then material would be imported from outside sources to include potential acquisition from an existing mineral material operation. Such material would be required to be free from cultural resources, seeds from invasive/non-native species, and contamination.

Re-contouring is usually done at the same time the mine feature has been backfilled, which involves shaping the land to give it more natural features and addressing concerns in geology, hydrology, wildlife habitat, and visual considerations. The final grading and contouring would shape the terrain to prevent mining waste from being transported off-site by wind or water erosion.

Polyurethane Foam (PUF) Plug

Where backfill is not feasible because of size or depth of the shaft or the lack of access to backfill material, a PUF plug may be used to remediate the physical safety hazard (Photo 3 and Appendix D Figure D-6). The PUF can be installed in either vertical or horizontal mine features (Appendix A). A PUF closure consists of installing a false bottom form, installing the plug to specifications (Appendix E), and backfilling over the PUF to the specified level using common fill. In some instances a cast-in-place concrete slab, rock armoring, or construction of a rock wall may be used to prevent vandalism. Drainage pipes, wildlife access ways, and ventilation pipes may be required.

Photo 3. Installation of PUF in a shaft (photo taken by S. White 2009)

The PUF plug is designed for molding and void filling applications and would be composed of hand-mixed or prepackaged polyurethane foam. The plug is either co-blown (a mixture of solvent and water) or

water blown (100 percent water) for installation. Engineering details for both types of plugs are included in Appendix E. The thickness of the plugs would be determined on a site-specific basis with a minimum thickness of four feet and a maximum thickness of eight feet.

The typical method of installing a false bottom in a shaft or trench first involves measuring the dimensions of the mine feature at the location at which the plug would be installed. These measurements are transposed on a large piece of plastic lying on the ground. Mixed foam is poured onto the plastic to a cured thickness of about three inches thick. The wafer is then cut to the dimensions of the plug, inserted and placed by hand, and secured at the required plug depth. Any holes or voids are plugged with excess cured foam. Foam is poured on top or in front of the wafer and allowed to cure in stages until a formula thickness is obtained. Typically, this process takes one day to cure before the remaining portion of the feature is typically backfilled by hand with rock or loose earth to provide a fire proof barrier. Because foam is sensitive to ultraviolet radiation, it must always be armored with backfill or other covering (Bat Conservation International [BCI] 2009).

This method typically does not require the use of mechanized earth moving equipment and allows the surface expression of the feature to be left intact.

Blasting

Blasting can be used to permanently seal an AML feature opening. It is not a preferred method of closure because it involves the destruction (implosion) of the feature expression. However, the use of explosives could be utilized where the feature cannot be remediated by any other means and there are no other significant impacts to other resources.

Blasting generally entails drilling holes with a rock drill where explosives would be placed. The number of holes and the amount of explosives is designed based on the amount of rock required to adequately fill the opening. Blasting almost always occurs at the portal or collar of the feature because placing the explosive charge within the feature may destabilize the feature opening and create a more serious physical hazard. Blasting is not performed where residential or other sensitive receptors are present. In these cases other means of remediation would be employed.

Explosives and portable drilling equipment can be brought into a site by either small vehicle (4x4 pickup truck), helicopter, or packed in by animals. The blasting plan would be approved and sealed in the Remediation Plan.

2.2.4.3 Method III: Installing Gates, Cupolas, Culverts and/or Grates

For certain cases it may be desirable to maintain limited and controlled accessibility to an AML feature. In these cases, protective remedies which allow controlled access by authorized individuals and or wildlife would be employed. Such techniques include gates, cupolas, culverts, or grates in a variety of designs built from a wide range of materials (Photos 4 to 6). Construction material would be recommended by the evaluation team based on the type of remediation selected and the project budget. Construction material and design would be recommended during the planning phase of the project and modified as necessary. Typically these closure remedies are constructed of vandal-resistant materials, such as heavy gauge steel, reinforced concrete, or heavy gauge expanded or steel wire mesh. These methods generally have a higher cost than other methods of closure such as fencing, backfill, or foam plugging.

Construction of steel structures typically requires welding. Welding can be done on-site using gasoline or diesel powered electric welding equipment that requires vehicle access. Cutting and welding would always be conducted in areas that have been made fire safe by removing vegetation or protecting vegetation from ignition sources by wetting the worksite and the downwind area with water prior to welding. Before cutting or welding operations begin, a person would be designated as the "fire watch." During welding operation, the fire watch would be responsible for re-wetting vegetation surrounding the work site for ongoing fire prevention. A fire prevention section would be included in the Remediation Plan and would be approved by a fire prevention specialist for any remediation that utilized welding.

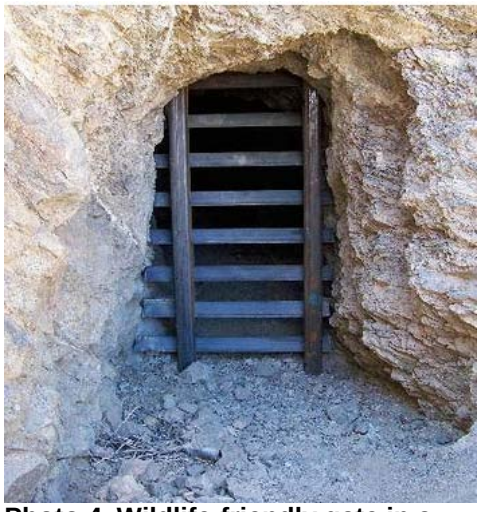

Photo 4. Wildlife-friendly gate in a tunnel (photo taken by S. White 2009)

Structures constructed off-site would require motorized vehicle access for transport and installation, and depending on need may be brought in by helicopter.

Before a gate, cupola, culvert, or grate is installed into an AML feature, stabilization of the collar or portal may be required. For example, many adit portals are located in unstable ground or are being slowly closed through slope creep. Timbering at many shaft collars was often extended above the original ground level and backfilled with muck to create a flat surface for working and equipment. After the mine is abandoned, the timber rots and the muck eventually falls into the shaft. Stabilization may involve removal of loose rock, installation of concrete to creating a supporting frame in the collar or portal, installation of a culvert, or application of wire mesh across horizontal roofs or along rib and shaft walls to stabilize loose material. Concrete and reinforcing material may be carried in and mixed on site for reclamation of small mine features. For larger mine features, use of concrete mixing vehicles and equipment may be required.

Photo 5. Culvert recessed inside the portal of a shaft.

Photo 6.Cupola installed over the culvert (photos taken by S. White 2009)

Culverts are widely used in stabilizing mine openings. Although they can be made of a variety of materials, the most readily available and commonly used culverts in construction are the corrugated steel. PUF could be used to secure culvert gates and to stabilize

unstable portals. The location for a culvert gate is recessed inside the portal of the mine opening and attached by anchoring, bolting or welding to the interior of the culvert. To minimize the loss of space for passage of authorized personnel or wildlife, culvert size is designed to match the size of the portal and placed at a parallel angle to the mine feature being protected.

Generalized diagrams for gates, cupolas, culverts, and grates with and without wildlife access features are included in Appendix D (Figures D-7 to D-10). Specifications for materials and design of gates, cupolas, and grates are developed after site inspection by the technical specialist (generalized engineering specifications are included in Appendix E). Within a single gate, bar spacing and other modifications may be applied to meet site-specific requirements and to best accommodate the size and number of individual wildlife species that may be using the AML feature for habitat. Gates, cupolas, or other similar enclosures would be designed, treated, or placed in such a way as to minimize effects to significant historic or cultural values. Careful consideration would be used to select an appropriate closure technique that controls public access, minimizes impacts on wildlife species using the AML feature, and provides for worker safety during construction.

Attaching the gates, cupolas, or grates and installation of the culverts may require access to fill material. Earthen material, including soil and stone, would be selected that blends in with the surrounding landscape. Material that is brought in from off-site would be selected to be free of invasive weed species and their seeds, cultural resources, and contamination. If material is used from on-site, the material, the access route to the material, and the surrounding area would be included in the biological and cultural resource assessments. Attaching the gate, cupolas, or grates and installation of the culverts typically requires the removal of material. If material is removed, it would be placed in a location that has been reviewed for visual, cultural, and biological resources impacts. The Remediation Plan will include the details of the gate, cupola, culvert, or grate design, construction, installation, and maintenance.

2.2.4.4 AML Remediation Plan Summary Document

Based on the information from the accessibility assessment, external and internal site surveys, and evaluation of remediation and closure methods, the evaluation team would develop a written Remediation Plan, a report with site-specific recommendations with regard to all remediation and closure activities. Recommendations would include, but not be limited to: 1) Identification of any threatened and endangered species or California species of special concern present in the area of project activities; 2) identification of cultural resources present in the project area; 3) the remediation and closure technique (selected from those discussed above), including a determination of whether specific structural remediation with regard to AML walls or support structures would be required; 4)specification on access routes to be used for all site activities; and 5) recommended post-closure monitoring schedule.

Additionally, each specialist on the interdisciplinary team would complete the appropriate discipline-specific compliance activities. Compliance activities would include, but not be limited to completion of the Notice of Proposed Action by the wilderness specialist; compliance with Section 106 of the NHPA; Tribal consultation; and written documentation of Endangered Species Act (ESA) compliance completed by the biologist.

If the interdisciplinary team agrees that potential impacts associated with a specific AML feature are adequately evaluated with respect to the analysis presented in this PEA, then the team leader would prepare a CX for the Field Manager's signature. The CX would describe the AML, the method of remediation, the materials, and any mitigation measures identified by the

interdisciplinary team. The detailed Remediation Plan would be attached. For AML with extraordinary circumstances or potentially significant resource impacts, a site-specific EA or EIS tiered from this PEA would be completed to identify the method and process that should be utilized for remediation and closure.

2.2.5 Implement Remediation Actions

Following management review of the Remediation Plan, BLM would approve and construct the selected remediation and closure method and implement the stipulated mitigation measures.

Upon completion of all remediation and closure actions, the project lead would inspect the site to assure that the site is clean and that any surface disturbance associated with the remediation activity has been reclaimed. All waste generated on-site would be removed. Any spills on-site would be cleaned up in accordance with BML and local land use plan policies and any contaminated soils would be removed from site. Any area affected by off-route travel would be raked to physically remove all tracks that were created at any location that is not a designated open route.

The BLM has observed in past remediation efforts that accessing the project site generally requires one trip in and out per day until the job has been completed. Table 1 shows the duration of typical remediation time periods to complete all three phases of the project.

Table 1. Remediation Times

Remedy Type	Estimated Construction Time per Feature
Fence	1 Day
Backfill	1 Day
Foam Plug	1-2 Days
Wildlife Friendly Gate	1-2 Days
Wildlife Friendly Cupola/Grate/Culvert	2-4 Days

2.2.6 Project Closure and Monitoring

Two types of remediation monitoring would be conducted by the BLM. One type is implementation monitoring, to evaluate the project site and determine whether the selected remediation closure technique was installed as planned. This monitoring would be performed during construction by the project lead and appropriate team members for the resources present. Implementation monitoring would typically be performed at the land use planning level or through annual work plan accomplishment reporting.

The second type of remediation monitoring is effectiveness monitoring, which evaluates whether the remediation closure treatment is effective and fulfills the project purpose. Effectiveness monitoring is usually done at the local project implementation level. The site-specific monitoring schedule would be recommended by the evaluation team when developing the Remediation

Plan. The frequency of post-closure monitoring would be determined based on the type of closure method employed, the location of the AML feature's proximity to high-use recreation areas, and the occurrence of wildfires in the area. For AML sites located in high-use areas, a more frequent monitoring rate is recommended no matter the closure method, especially for sites closed with a fence or gate which can be easily vandalized. All post-closure AML sites in high-use areas should be monitored on at least a quarterly basis, though more frequent monitoring may be necessary and would be recommended by the evaluation team on a site-specific basis. For AML sites in more remote areas monitoring would be conducted on a yearly basis unless otherwise designated by the evaluation team on a site-specific basis.

2.3 CLOSURE METHOD ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED ANALYSIS

One alternative closure technique was initially proposed but was eliminated from further consideration: the use of sewage sludge or solid waste material (asphalt and Portland cement concrete) to fill the AML features. This alternative was eliminated because of the unknown chemical composition of the off-site waste material. For example, the waste material could contain a level of toxicity that may be hazardous to humans or wildlife. Therefore, detailed characterization of the proposed waste material would be required. In addition, without extensive site-specific studies of groundwater and fault lines, and extensive review of the chemical and physical composition of the solid waste and sludge material, BLM is concerned that new health and safety risks could be created by this technique. These studies would add significantly to the cost of any remediation project. Therefore, this remediation closure technique was eliminated from consideration.

2.4 SUMMARY COMPARISON OF ALTERNATIVES

The overall conclusions regarding the possible direct, indirect, and residual impacts for each alternative on the resources of the existing environment, and the potential for these impacts to be significant are summarized in this section. The alternatives can have impacts on resources which are adverse, beneficial, or both adverse and beneficial. The environmental resources potentially affected by the alternatives are described in Chapter 3, Affected Environment. Chapter 4, Environmental Impacts and Mitigation, describes the potential direct and indirect and impacts on each resource that could be associated with each alternative and then discusses the mitigation measures that would minimize or avoid these potential impacts. Chapter 4 concludes with an evaluation of any residual impacts remaining after mitigation measures are taken for each resource area. Table 3 summarizes the conclusions reached for each alternative:

Table 2. Summary of Potential Environmental Impacts

Resource	No Action Alternative	Proposed Action
Transportation	Potential impacts similar to the proposed action. Minor to significant impacts, resulting from unplanned road usage and creation in potentially sensitive areas.	Vehicle use in accordance with established land use regulations. Open roads utilized unless no other option exists. Extensive mitigation measures proposed to minimize potential impacts. Therefore, residual impacts should be minor.
Biological Resources	Potential impacts similar to the proposed action. Minor to significant impacts, resulting from emergency, unplanned closures that do not take into consideration biological resources as part of a prescribed process.	Could potentially impact biological resources through habitat loss, and damage to or elimination of select individuals. Mitigation procedures include surveys for biological resources prior to selection of a closure method, and a pre-approved (by the U.S. Fish and Wildlife Service [USFWS]) set of mitigation measures will be used to reduce impacts further. At sites where the mine is utilized by wildlife, mitigation procedures that allow for wildlife access are available. Threatened and endangered species are identified, and procedures for minimizing impact to them are prescribed.
Cultural Resources	Potential impacts similar to the proposed action. The BLM already has a plan in place to mitigate impacts to cultural resources, even in the case of emergency mine closures. Potential impacts to cultural resources are expected to be minimal.	Potential impacts include damage to or destruction of cultural resources. Thorough evaluation of the site, including access to the site, would be done to identify potential cultural resources and mitigate impacts. Minor adverse impacts to cultural resources may occur during implementation of site activities.
Mineral Resources	Potential impacts similar to the proposed action. Under the No Action alternative, mineral resources and the potential future economic potential of an AML site is evaluated on a case-by-case basis. No potential impacts to mineral resources are anticipated.	Potential impacts include damage to mineral resources. Under the proposed action, each site would be analyzed for mineral resources and future economic potential. Several options of mine closure methods are available that allow for future access, and are non-destructive to existing mineral resources. Potential impacts to mineral resources are anticipated to be minor to none.

Table 2. Summary of Potential Environmental Impacts (Continued)

Resource	No Action Alternative	Proposed Action
Paleontological Resources	Potential impacts similar to the proposed action. Under the current closure procedure, only minimal attention is paid to identifying, minimizing and mitigating impacts to paleontological resources.	Potential impacts include damage to paleontological resources. Under the proposed action, paleontological resources would be identified in the site assessment and mitigation measures proposed to reduce impacts. Therefore, potential impacts would be minor.
Soils	Potential impacts similar to the proposed action. Under the No Action alternative, there would be potential adverse impacts to soils. Currently, only minimal attention is paid to avoiding, minimizing or mitigating potential adverse effects.	Potential impacts include enhanced erosion and mobilization of dust. Under the proposed action, a full plan is given in order to first identify, then avoid or mitigate potential impacts to soils, therefore minimal impact is expected. Identified potential impacts include erosion and soil entrainment due to vehicle access and other disturbance, but as stated, mitigation procedures are outlined to minimize these impacts.
Water Resources	Potential impacts similar to the proposed action. Given the small number of water resources in the area and the small scale of individual project activities, impacts would be expected to be minor.	Potential impacts include water diversions, enhanced erosion, and water quality impacts. Given the small number of water resources in the area, and with implementation of mitigation measures and long-term monitoring, impacts would be expected to be minor.
Noise and Vibrations	Potential impacts similar to the proposed action. Under the No Action alternative, potential adverse impacts to noise and vibration could occur, as there is only minimal attention paid to avoiding, minimizing and mitigating potential adverse impacts.	Temporary increased noise levels are expected with the proposed action. This includes heavy machinery transportation disturbances associated with site access, and minor construction noise and vibration disturbances on site during the closure process. By following the mitigation guidelines set forth in the transportation section, these impacts are expected to be minor, localized, and temporary.
Air Quality	Potential impacts similar to the proposed action. Under the No Action alternative, potential impacts, including fugitive dust (PM_{10}) and ozone emissions, would be expected, but would be minor and temporary.	Under the proposed action, potential impacts, including fugitive dust (PM_{10}) and ozone emissions would be expected, but would be minor and temporary. Mitigation procedures such as speed limits and guidelines for minimizing dust and vehicle emissions are outlined.

Table 2. Summary of Potential Environmental Impacts (Continued)

Resource	No Action Alternative	Proposed Action
Visual Resources	Potential impacts similar to the proposed action. Under the No Action alternative, only minimal attention is paid to identifying, avoiding and mitigating impacts to visual resources. Given the scale of project activities, potential impacts to visual resources would be expected to be minor, but could be more significant depending on the nature of the site.	As part of the proposed action, a Visual Resource Inventory would be done to identify visual resources in the project area and along the transportation routes. This process would assist in the identification of impacts, and mitigation procedures are outlined in this document. Due to the attention paid to identification and mitigation, impacts to visual resources are expected to be minimal.
Recreation	Potential impacts similar to the proposed action. Under the No Action alternative, impacts to recreation would not occur as quickly because the mine features would not be remediated as quickly. This results in a negative impact to human health and safety as a result of recreation in areas with abandoned mines.	Under the proposed action, impacts to recreation would be minor. Remediation of the abandoned mine features would be done with the goal of reducing the dangers of public recreation associated with AML sites. Therefore, impacts to recreation resources would be beneficial.
Hazardous and Solid Wastes	Potential impacts similar to the proposed action. The current emergency closure process pays minimal attention to avoiding, minimizing or mitigating potential impacts.	Under the proposed action, the potential for adverse impacts exists, mainly due to spillages of fluids from vehicles. None of the mine closure methods produce a significant amount of hazardous or solid wastes. Mitigation methods, such as vehicle operations inspections will be performed to prevent spillages, and workers in the area will be required to remove any waste produced and dispose of it properly. Therefore, minimal impacts are expected from the proposed action.
Fire Protection	Potential impacts similar to the proposed action. Under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Impacts could be significant in the existing climate.	Under the proposed action, minimal adverse impacts to fire protection are expected. These impacts include ignition sources from vehicles and welding. Mitigation procedures have been outlined to minimize these risks. Potential impacts are not anticipated.

Table 2. Summary of Potential Environmental Impacts (Continued)

Resource	No Action Alternative	Proposed Action
Designated Special Use Areas	Potential impacts similar to the proposed action. Under the no action alternative, currently no remediation is performed in Wilderness areas or WSAs. The consequences are that wilderness values of naturalness would continue to be degraded. Some open shafts would not be remediated and thus would be, from their immediate vicinity, an obvious imprint of man.	Under the proposed action, remediation procedures would be carried out in accordance to existing land use regulations (no vehicle travel in special use areas such as Wildernesses) and closures would be evaluated on a case by case basis to keep impacts minimal.

3.0 AFFECTED ENVIRONMENT

The characteristics of the affected environment are presented in this chapter. Environmental and cultural resources that could be affected by the proposed action of remediating the public safety hazards and closing AML features are identified and described in accordance with 40 CFR 1508.14 and 1508.26.

This PEA contains the results of a systematic evaluation of the potential direct, indirect, and residual impacts of the no action alternative and the proposed action on 15 primary environmental resource areas. The 15 environmental resources evaluated are transportation, biological resources, cultural resources, mineral resources, paleontological resources, soils, water resources, noise and vibrations, air quality, visual resources, recreation, hazardous and solid waste, fire protection, and designated special use areas.

Critical resources that are not expected to be affected, and therefore were not included in this analysis are: socioeconomics, prime and unique farmlands, wild and scenic rivers, floodplains, wetlands and riparian areas, and park lands. The following is a discussion of those elements identified as being present within the CDD.

3.1 TRANSPORTATION

To remediate AML features, some type of access across public lands would be required. Public access routes and trails exist that are used for a variety of purposes, including economic pursuits and recreation. Most desert visitors who venture off the major interstates and highways will travel at least some of the time on the network of maintained gravel and dirt roads, trails, and accessible desert washes. There are many of these “routes of travel” in the CDD.

According to one study, the CDCA has 15,000 miles of paved and maintained roads, 21,000 miles of unmaintained dirt routes, and 7,000 miles of vehicle-accessible washes. As can be seen in Figure B-3 (Appendix B), these routes are not evenly distributed, and desert topography and vegetation do not prevent, and sometimes encourage, cross-country travel in motorized vehicles. Desert soils and vegetation retain the marks of this kind of travel for many years, except in a few places where occasional rains, windstorms, and flash floods erase them. Thus, one vehicle traveling cross-country can create a new route of travel. The proliferation of routes and trails in the CDCA has resulted in a serious problem in some areas and provides the most difficult management issue for the BLM and the public. Many of these routes are in disrepair and would require the filling of low spots or grading of high spots to allow vehicle access into a project area.

While the BLM is responsible for motorized vehicle use on public lands, much of how the routes are actually used is based on how well the public complies with BLM’s motorized vehicle area and route designations. Some routes that still appear on the ground have been designated as “closed” routes by the BLM, including some routes in the vicinity of AML features. While motorized vehicle use along these routes is not allowed, the degree to which the public complies with these restrictions varies. The BLM does not and is not anticipated to have sufficient funds or staff to oversee vehicle use throughout the desert at all times. Therefore, rules for vehicle use must be fair, understandable, easy to follow, and reasonable, if they are to be publicly accepted. The cooperation of public land users is essential to effective motorized vehicle management throughout the California desert. In 1982, the BLM amended the CDCA Management Plan’s Motorized-Vehicle Access element to conform with 43 CFR 8342.1, Off-

Road Vehicles, Designation of Areas and Trails. The following regulations regarding vehicle use within the CDCA would apply to AML remediation closure activities.

3.1.1 Route Location

The new amendment (1982 CDCA Plan Amendment Three, approved May 17, 1983) specified that areas and trails should be located in such a way as to:

- Minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability;
- Minimize harassment of wildlife or significant disruption of wildlife habitats with special attention given to protect endangered or threatened species and their habitats;
- Minimize conflicts between OHV use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors; and
- Not be located in officially designated Wilderness areas or primitive areas. Areas and trails should be located in natural areas only if the authorized officer determines that vehicle use in such locations would not adversely affect their natural, aesthetic, scenic, or other values for which such areas are established.

3.1.2 Route Designation

Except in Congressionally-designated Wilderness areas, “open,” “limited,” and “closed” route designations may be made in ACECs and unclassified lands. The 1982 CDCA Plan amendment established the following route regulations for open, limited, and closed areas. Access by motorized vehicles is allowed on open routes. For limited routes, access on the route is limited with respect to: 1) the number and types of vehicles allowed; 2) restrictions on times or seasons of use; 3) restrictions for permitted or licensed vehicle use, and/or; 4) establishment of speed limits. Motorized vehicle access on closed routes is prohibited except when:

- Expressly authorized by an agency head under a permit, lease, or contract;
- Used for official purposes by employees, agents, or designated representatives of the federal government or one of its contractors; and
- Emergency or national defense situations require fire, military, emergency, or law enforcement vehicle access.

3.1.3 Vehicle Use in Multiple-Use Class Areas

The CDCA Plan established multiple-use class (MUC) designations for publically managed lands based on the sensitivity of resources and the varieties of use in those geographic areas. The 1982 amendment modified or reiterated restrictions on motorized-vehicle access based on these MUC designations. These guidelines are described below.

Areas designated as ACECs, MUC “C”, and MUC “L” have similar restrictions on vehicle use. Areas in the CDCA designated MUC “C” are, or have been recommended to become Wilderness areas and vehicle use on these lands is limited. Regions designated MUC “L” are managed for limited use and are carefully controlled to protect sensitive resources. Vehicles in MUC “C” and “L” areas are restricted to existing “open” or, as appropriate, “limited” routes. Routes not currently approved in these areas will be reviewed and either become approved or,

after opportunity for public comment, closed if they conflict with management objectives or cause unacceptable resource damage.

Within the CDCA, MUC "M" areas are designated as moderate use allowing for a variety of activities while maintaining attention to conservation and mitigation. Vehicle access in MUC "M" areas is on "existing" routes. An "existing" route is one established before approval of the CDCA Plan in 1980, with a minimum width of two feet, showing significant surface evidence of prior vehicle use o, for washes, history of prior use. In certain circumstances, existing routes may be designated "limited" if concerns regarding use arise.

Vehicle use in MUC "I" areas is the least restrictive. These areas are designated as intensive use and as such are expected to have higher levels of ongoing activity and vehicle movement. For MUC "I" areas, unless it is determined that further limitations are necessary, those areas not designated "open" will be limited to use of "existing" routes.

In areas not assigned to a MUC, the route approval process will be applied as needed to resolve specific problems and to establish a cohesive program.

3.1.4 Washes, Sand Dunes, and Dry Lakes

In the CDCA, OHV travel is common for recreational, commercial, and other purposes. The 1982 CDCA Plan amendment also addressed motorized-vehicle access on washes, sand dunes, and dry lakes.

In the context of motorized-vehicle access, the term "wash" is defined as a watercourse, either dry or with running or standing water, which by its physical nature—width, soil, slope, topography, vegetative cover, etc.—permits the passage of motorized vehicles (Appendix VI, CDCA Plan). The implication of this definition is that washes can be considered as routes of travel only if wash banks are not compromised (primarily a function of width), soil stability is not adversely affected, and vegetation is not destroyed consequent to the passage of vehicles. If access to a wash by motorized vehicles results in vegetative destruction, disturbance to the integrity of wash banks, or an unacceptable degree of soil erosion—the destruction of natural features—the wash is not considered to be a route of travel.

Vehicle access using desert washes will be governed by the area designation for the vicinity in which the wash is located. In areas designated "closed," vehicle access in desert washes will be prohibited. In areas designated "open," vehicle access in desert washes will be permitted. In all "limited" areas, vehicle use in desert washes will be controlled in the same manner as for routes of travel in MUC "L," "M," and "I."

Due to the unique geography of sand dunes and dry lakes, in these areas "routes of travel" cannot be readily delineated. Therefore, significant sand dunes and dry lakes within the California desert are designated either "open" or "closed" to vehicular travel regardless of the MUC designation in which the dune system or dry lake is located. The management objective for each dune system or dry lake will dictate the area's vehicle use designation.

3.2 BIOLOGICAL RESOURCES

Mines may form a shelter or habitat for a variety of vegetation and wildlife species. Mines may also provide a water source from which a variety of species may take substance. Mines can

facilitate the interchange between surface and groundwater, can provide shade in which pools of runoff water persist, and can contribute to the development of wetlands around feature entrances.

3.2.1 **Vegetation**

A common attribute of deserts is the sparseness of plant cover. Plants are very important to the desert ecosystem and to its aesthetic aspect. Annual wildflower displays occur extensively in spring throughout the CDD. Profusion of these displays relates to the frequency and intensity of precipitation during the fall and winter months. Intense summer storms bring other species that complete their active life cycle in a matter of weeks. While wildflower displays and other special characteristics of desert vegetation provide enjoyment to desert visitors, they also serve to maintain the rich diversity of vegetation and wildlife in the CDD.

Floristic associations found in the Mojave and Colorado deserts are present in the CDD. Vegetation of the Mojave is "conspicuously shrubby," with Creosote bush (*Larrea tridentate*), bur sage (*Ambrosia dumosa*), and Black brush (*Coleogyne ramosissima*) occupying the broad intermountain plains. The Joshua tree (*Yucca brevifolia*), the signature plant for the Mojave desert, borders these intermountain plains and is found at a slightly higher elevation. Vegetation largely confined to the Colorado desert includes California fan palm (*Washingtonia filifera*), Parry nolina (*Nolina bigelovii*), desert apricot (*Prunus fremontii*), and Ocotillo (Foquieria splendens).

A common thread to all of the vegetation series is the occurrence of a diverse groundcover of annual plants. The annual (ephemeral) vegetation is extremely variable in biomass production, ground cover, and species composition year-to-year and site-to-site. Species composition is tied to germinating conditions. The annual grasses (mostly introduced) would germinate under much cooler conditions than the broad-leafed forbs. Many of the forbs are showy wildflowers.

A common characteristic of disturbed ground associated with AML features in the southwest desert is the preponderance of invasive vegetation. Two common invasive species found in the CDD include salt cedar (*Tamarix ramosissima*) and Sahara mustard (*Brassica tournefortii*). Invasive species tend to displace native species and upset the existing flora and fauna balance. Disturbed areas associated with AML features can also be fertile ground for native species; however, the density and diversity tend to be out of sync with the natural environment.

3.2.2 **Wildlife**

Mammals which have the potential to occur within the CDD include desert bighorn sheep (*Ovis canadensis nelsoni*), mule deer (*Odocoileus hemionus*), desert kit fox (*Vulpes macrotis arsipus*), coyote (*Canis latrans)*, spotted skunk (*Spilogale gracilis*), black-tailed jackrabbit (*Lepus californicus*), ground squirrel (*Spermophilus)*, kangaroo rat (*Dipodomys)*, and mice. Birds commonly occurring within the CDD include eagles, hawks, owls, quail, white-winged dove, roadrunner, finches, warblers, and orioles. Reptiles present in the CDD include several species of rattlesnakes and lizards including the Chucwalla and fringe-toed lizard. In addition to the above mentioned wildlife, many species including birds, reptiles, insects, and a variety of mammals, most notably bats are frequently present within the mine itself utilizing the AML features as either temporary shelter or more permanent habitat.

3.2.2.1 Bats

Bats require roosts with specific conditions at certain times of the year and will therefore often move from location to location as their needs change (Bat Conservation Trust 2010). In the CDD, AML features provide habitats for a variety of roost types including hibernacula (for periods of hibernation), maternity, day roosts, and night roosts. Bat species found in AML features in the CDD include the California Leaf-nosed bat (*Macrotus californicus*) (Photo 7), Pallid bat (*Antrozous pallidus*), Townsends Big-eared bat (*Corynorhinus townsendi*), Small-footed Myotis (*Myotis subulatus*), Fringed Myotis (*Myotis thysanodes*), Cave Myotis (*Myotis velifer*), Long-legged Myotis (*Myotis volans*), and Yuma Myotis (*Myotis yumanensis*). All of these bat species are designated as California BLM Sensitive Species or California State Species of Special Concern.

Photo 7. California Leaf-nosed bat (photo taken by S. White, 2009)

Mines with high potential for bat use generally have one or more of the following:

- Large, complex underground features;
- Features with underground interconnections;
- Multiple, scattered surface openings; or
- Air movement at a portal.

Virtually any abandoned mine could be used as roosting habitat for bats. However, where the ribs, back, and sill of shallow adits are visible from the portal and no lateral workings and sign of bat use is seen, it is safe to assume that the site has low potential as bat habitat. Similarly, mines that are flooded above any lateral connections and/or even periodically flooded to within a foot of the back are not likely to provide suitable roosting sites (Altenbach and Brown 2000). In mines with multiple openings, any significant bat use is at least partially dependant on airflow patterns (BCI 2009).

3.2.2.2 Threatened and Endangered Species

A total of 12 species of vascular plants have been identified as threatened or endangered in the CDD. Two more have been designated by the State of California as endangered or rare (Table 3 of the CDCA Plan). Many other species are local endemics (unique to a specific location or habitat), have limited distributions, or are restricted to specific soil types and are considered rare and endangered by the California Native Plant Society (CNPS 2001).

The CDD supports over 635 species of vertebrates and thousands of invertebrate organisms in a diversity of wildlife habitats. Specific management is required to protect unique and sensitive habitats; sensitive, rare, threatened, and endangered species; and representatives of more common desert habitats and ecosystems and the fish and wildlife resources they support.

A number of federal and state listed threatened and endangered species are found in the CDD including Peninsular bighorn sheep (*Ovis canadensis nelsoni)*, desert tortoise (*Gopherus agassizii)*, least Bell's vireo (*Vireo bellii pusillus*)*,* and Palm Springs Round-tail ground squirrel

(*Spermophilus tereticaudus chlorus)*. Bighorn sheep are known to take refuge from the desert heat in abandoned mines; desert tortoises have been shown to use mine adits as shelter and have been found at the bottom of open mine shafts. Mohave ground squirrels (*Xerospermophilus mohavensis*) can be found in areas where there are abandoned mines, but are not known to utilize them. However, kangaroo rats (*Dipodomys*) are known to inhabit abandoned mines and their presence is clearly evident. A full list of federally listed threatened and endangered species and California Species of Special Concern likely to be found within the CDD is included in Appendix F.

Desert Tortoise (*Gopherus agassizii*)

The desert tortoise is both federally and state-listed as threatened. In 1989, the USF WS gave temporary emergency protection to the desert tortoise in the Mojave region. Long-term protection replaced the temporary measure when the Mojave population was listed as threatened under the ESA. Some AML sites scheduled for remediation and closure are located within the designated evolutionarily significant units, distinguished within the Desert Tortoise (Mojave Population) Recovery Plan 1994 (USFWS 1994). The desert tortoise habitat range includes the Mojave and Sonoran deserts in southwestern Utah, southern Nevada, southeastern California, and western Arizona. To survive the harshness of the desert, the desert tortoise spends up to 95 percent of its life underground, within shallow burrows or caves. Since desert tortoises spend much of their lives in shallow burrows and feed on native plants, they are most vulnerable to any activity that may change their habitat. They tend to have a variety of habitats from sandy flats to rocky foothills, including alluvial fans, washes and canyons where suitable soils for den construction can be found. Desert tortoises have also been found in AML features. The Desert Tortoise Recovery Plan created recovery units within the six million acres of land where tortoises live. Each unit was then analyzed to address the threats to the species in that area, taking into consideration the multiple uses of the land such as grazing, mining, OHV use, and development.

Peninsular Bighorn Sheep (*Ovis canadensis nelsoni*)

The Peninsular bighorn sheep are a Distinct Population Segment (DPS) of desert bighorn sheep (USFWS 1998a) that occupy the Peninsular Ranges of Southern California, ranging from the San Jacinto Mountains in California south to the Volcan Tres Virgenes Mountains in Baja California, Mexico. Peninsular bighorn sheep have been listed under CESA since 1971. In March 1998, the USFWS claimed a final rule designating the Peninsular Bighorn Sheep, occupying the Peninsular Ranges of southern California, to be an endangered species pursuant to the ESA (16 USC 1531 *et seq.*). AML features are located within areas which the bighorn sheep may have the potential to reside. Bighorn sheep are typically found on open, rocky, steep areas (which are used for escape cover and shelter) with available water and herbaceous vegetation for forage. Most of the bighorn sheep live between 300 to 4,000 ft in elevation, where the annual precipitation is less than 4 inches and daily high temperatures average 104 degrees Fahrenheit (°F) in the summer. Bighorn sheep congregate near dependable water sources from May through October. These population aggregations during this period are due to a combination of breeding activities and diminishing water sources. It is common for males and females to segregate and occupy different habitats outside the breeding season. It is possible that bighorn sheep may occasionally utilize some AML features for shade.

Least Bell's Vireo (*Vireo bellii pusillus*)

The Least Bell's Vireo was listed as a state endangered species by the California Fish and Game Commission in 1980 and as a federally endangered species in 1986. Critical habitat for the species was designated in 1994. The Least Bell's Vireo is the only one of four subspecies of the Bell's Vireo species that is designated as endangered. Least Bell's Vireos are small song birds. The Least Bell's Vireo once was common in the Central Valley of California. The removal of 90 percent of riparian habitat forced most of them out. Before their habitat was restored at San Joaquin River National Wildlife Refuge, the last confirmed breeding was in 1919. In 2005, a pair of Least Bell's Vireos nested at the San Joaquin River refuge. They came back in 2006 (USFWS 2010A). They are 11.5 to 12.5 centimeters long (approximately 4.5 to 5.0 inches) with short rounded wings and short, straight bills. There is a faint white eye ring. Feathers are mostly gray above and pale below, a common protective marking in birds. Seen from below, the bird blends into the clouds. From above, it blends into the groundcover. The Least Bell's Vireo nests in shrub or low tree, usually averaging about 1 m above ground, typically in horizontal or down sloping twig fork, most often near edge of thicket and along riparian habitat. This nesting habit makes them vulnerable to predators as well as human impacts involving recreation activities and OHV traffic. Nesting vegetation in California is often willow or California Wild Rose, 3 to 5 m in height (Natureserve 2010).

San Bernardino Merriam's Kangaroo Rat *(Dipodomys merriami parvus and* Stephens' Kangaroo Rat (*Dipodomys stephensi (incl. D. cascus)*

Two of the largest remaining populations of the San Bernardino Merriam's Kangaroo Rat subspecies are endangered due to their small size, and habitat loss caused by changes in the natural stream flow regime, including seasonal flooding and associated modification of plant succession patterns. Below is a brief description of the endangered Kangaroo Rat subspecies (San Bernardino Merriam's kangaroo rat and Stephens' kangaroo rat) with the potential to be present within the CDD. The described kangaroo rats are three of the 19 species of Kangaroo rats (*genus Dipodomys*) that describe a distinct group of rodents within the family Heteromyidae.

Kangaroo rats are mammals specialized for rapid travel by hopping on their elongated hind legs and for transportation of food in their external cheek pouches. Primarily inhabiting relatively dry, open country of western North America, they construct burrows for shelter and often for food storage. It is possible that kangaroo rats may utilize some AML features for shelter or food storage. These species of kangaroo rats are found primarily on sandy loam substrates, characteristic of alluvial fans and flood plains, where they are able to dig simple, shallow burrows. The species tends to forage on seed and some herbaceous vegetation with insects supplementing their diet when available.

The range of the San Bernardino kangaroo rat partially overlaps the distribution of the Stephens' kangaroo rat (*Dipodomys stephensi*). Where these species occur in proximity, they are usually concentrated in different areas. The USFWS designated the San Bernardino Merriam's Kangaroo Rat as endangered in September 1998 pursuant to the ESA. The San Bernardino kangaroo rat (*Dipodomys merriami parvus*) is one of 19 recognized subspecies of Merriam's kangaroo rat (*D. merriami*) which is a widespread species distributed throughout arid regions of the western United States and northwestern Mexico. The San Bernardino kangaroo rat occurs in scattered, isolated patches of alluvial sage scrub habitat throughout San Bernardino and Riverside counties in Southern California. The San Bernardino kangaroo rat is considerably darker and much smaller than either of the other two subspecies of Merriam's kangaroo rat in

Southern California (USFWS 1998b). It is distinguished by pale yellow and dusky brown fur and dark brown tail stripes, footpads and tail hairs. The Stephens' Kangaroo Rat was originally listed as a threatened species by the California Department of Fish and Game in 1971 due to extensive loss of habitat in Riverside and San Diego Counties. The species was listed as endangered by the USFWS in 1988. The species is currently listed in recovery following completion of a five-year review (USFWS 2004). The Stephen's kangaroo rat typically is associated with open, arid, grassland areas. This is a medium-size kangaroo rat, with a white color on the underside, with many hairs on top and bottom of the tail, along with white stripes on the base. Their crested tail is about 1.5 times the body length; white tail stripe about half as wide as the dark dorsal stripe. The hindfoot has five toes and the soles of their feet are dusky.

Palm Spring Round-Tail Ground Squirrel (*Spermophilus tereticaudus chlorus*)

The USFWS listed the Palm Spring round-tail ground squirrel in May 2005 as a candidate species to be protected under the ESA of 1973. Identification of candidate species can assist environmental planning efforts by providing advance notice of potential listings, allowing resource managers to alleviate threats and thereby possibly remove the need to list species as endangered or threatened. The 2004 federal register review found no new updates to the candidate species per listing as endangered or threatened under the ESA of 1973. The Palm Springs round-tailed ground squirrel is one of four recognized subspecies of round-tailed ground squirrels. The range for the Palm Springs round-tailed ground squirrel corresponds to the Coachella Valley region in Riverside County, California (USFWS 2005). Primary habitat for the Palm Springs round- tailed ground squirrel is the dunes and hummocks associated with honey mesquite and to a lesser extent those dunes and hummocks associated with creosote, or other vegetation. Rapid growth of desert cities such as Palm Springs and Palm Desert in the Coachella Valley has raised concerns about the conservation of the Palm Springs round-tailed ground squirrel. Urban development and drops in the groundwater table have contributed to the rapid loss of the species habitat. Round-tailed ground squirrels are relatively small in comparison to other ground squirrels. They have a small rounded head with small ears and large dark eyes (USFWS 2010b). Round-tailed ground squirrels lack stripes and are even in coloration. Color phases include plain drab gray, pinkish cinnamon, or pale cinnamon brown. Unlike other ground squirrels, round-tailed ground squirrels have a relatively long tail which is round and not bushy.

Mohave Ground Squirrel (*Xerospermophilus mohavensis*)

The Mohave Ground Squirrel is California listed as a threatened species, but is not federally listed. They are small (approximately nine inches nose to tail) brown colored with a white belly, and have thin tails. The squirrel's habitat is limited to the western Mojave Desert, in the California Counties of Los Angeles, Inyo, Kern, and San Bernardino. They occupy Joshua tree woodlands, and saltbush, creosote and Mojave mixed woody scrub. The Mohave Ground Squirrel is a burrower, and is quite elusive. They are endangered mostly due to loss of habitat, and their population is very difficult to estimate due to their secretive nature. As stated above, Mohave Ground Squirrels are known to live in areas where abandoned mines are found but have not been show to utilize them.

A comprehensive list of federally listed threatened and endangered species and California State Species of Concern likely to have habitats within the CDD is included in Appendix F.

3.3 CULTURAL RESOURCES

There are approximately 10,000 cultural resources located on lands managed by the BLM in the CDD. These resources are primarily prehistoric and historic archaeological sites formally recorded through archaeological survey and other investigations. These sites represent less than five percent of public lands in the CDD. It is not known at this time how many of these recorded resources include mines, mining complexes, mining districts, or other mining features (Appendix A). However, a survey of existing records indicates a bias towards recordation of prehistoric sites and it is believed that formally recorded mining resources would constitute no more than five percent of existing site inventories, or approximately 500 sites.

3.3.1 Cultural Resource Management Guidelines

The BLM's cultural resource goals as described in the CDCA Plan (BLM 1980) are to:

- Broaden the archaeological and historical knowledge of the CDCA through continuing inventory efforts and the use of existing data. Continue the effort to identify a full array of the CDCA's cultural resources.
- Preserve and protect a representative sample of the full array of the CDCA's cultural resources.
- Ensure that cultural resources are given full consideration in land use planning and management decisions and ensure that BLM authorized actions avoid inadvertent impacts.
- Ensure proper data recovery of significant (National Register of Historic Places [NRHP] quality) archaeological sites where adverse impacts can be avoided.

The CDCA Plan outlines specifically how the BLM evaluates proposed actions based upon cultural resource impacts. The significant cultural resources are first identified and potential impacts resulting from the proposed action are considered. If it is deemed necessary, efforts are made to preserve and/or protect the identified cultural resources. Preservation and protection may include surveillance, stabilization/restoration, awareness education, and designation of specific vehicle routes to avoid identified resources. Once protection measures have been established and implemented, the cultural resources are monitored and inventoried and mitigation measures for project specific proposed actions are identified and enacted. When possible and appropriate, the cultural resource is extensively researched with the goal of widening the very limited amount of knowledge that exists for the California desert area.

Key to the BLM's cultural resource protection process is coordination with other agencies and legislation to ensure proper implementation of proposed actions. Such coordination includes implementation of any procedures relative to Section 106 of the NHPA, as implemented in the 2007 State Protocol Agreement among the State Protocol Director of the BLM, the California State Historic Preservation Officer (SHPO), and the Nevada SHPO.

3.3.2 Historic Cultural Resources

The public lands managed by the BLM have long been a source of minerals for various mining operations, especially for hard-rock and placer mining for gold and silver. Spanish missionaries, led by Father Francisco Garces from 1776 to 1880, were the first European miners to arrive in the California desert, prospecting and mining for gold in present day Imperial County in the Cargo Muchacho Mountains. With the discovery of gold in Northern California at Sutter's Mill in

1848, prospectors and miners from all over the country began descending upon California's hills and deserts in search of gold. Numerous mines and mining districts cropped up across the California desert during the peak period of mining between 1849 and 1932. Though some of these mines and districts are important within the context of southern California mining history, the gold produced in the California desert region between 1849 and 1965 was comparatively small and encompassed only approximately 5 percent of California's total gold production though 1965. By the 1950s gold mining in the California desert region had declined significantly with only occasional attempts to revive gold mining in certain areas. The great majority of mining claims and locations have been abandoned and relatively few sites survive with any intact structures. Most of what remains of these mines are the physical evidence of mining, such as tunnels, shafts, adits, mill tailings, waste piles, rock retaining walls, and foundations. For some remote mines, remnants of machinery, headframes, stamp mills, timbering, trash dumps, and other cultural features may also be present.

The extent of remaining historic mining resources in the California desert is unknown. Estimations from USGS map data indicate that there are approximately 8,500 discrete mine locations having multiple features (waste piles or tailings, shafts, tunnels, adits, structures) located within the boundaries of the CDD (Appendix A). Of the 8,500 discrete mining locations, it may be reasonably postulated that only about five percent of those have been formally identified and documented from a cultural resources perspective. It may be assumed that almost all of these mining sites are more than fifty years of age and would meet the minimum age threshold to be considered for inclusion on the NRHP.

Approximately, 3,640 of the 8,500 mines or claims are located on lands managed by the BLM. Based on extrapolations from sample data and field verifications about these mine locations, it is estimated that there are almost 28,000 individual features (Appendix A) most likely to be remediated and closed by methods proposed in this PEA, including 22,807 features located on public lands managed by the BLM. Of the above, there are 13,218 specific features located on lands managed by the BLM that can be categorized as mine shafts, mine tunnels, and prospects. These three categories are the types of features specifically targeted for remediation using measures proposed in this PEA.

Information about historic, mining-related resources are contained in a variety of general planning reports and project specific studies that have been conducted in the California desert over the past 30 years. One of the earliest and perhaps the most extensive study of mining conducted for the California desert region was *Desert Fever*, completed in 1980 by Gary L. Shumway, Larry Vredenburgh, and Russell Hartill. *Desert Fever* is a compilation of most of the available historical documentary material on mines that operated in the California desert region. Shumway et al. surveyed archival documents and conducted oral interviews documenting extensive mining operations in the desert area from 1760 to 1980.

The most recent study on mining in California was prepared by the California Department of Transportation in 2008 and is entitled *A Historical Context and Archaeological Research Design for Mining Properties in California.* The study provides a general overview of mining in California and provides an implementation plan for systematically recording and evaluating the significance of mining sites. This study details the common practices, equipment, and methodologies used by miners.

The most comprehensive report on gold mining in California, entitled *Gold Districts in California*, was completed in 1963 by William B. Clark and revised in 1992. Clark investigates the various gold mining districts in the state. Clark's study is a systematic account of the various mining

regions, mining districts and significant mining operations, their productivity and profitability. Clark also detailed the minerals and geographic setting, and provided a brief history of the mining districts of California.

Major mining related cultural resource studies for the California desert region include the following:

Burney, Michael; Van Wormer, Stephen; Hemphill, Claudia; Newland, James; Manley, William; Rushmore, F. Paul; Walter, Susan; Heupel, Neal; Schaefer, Jerry; Christenson, Lynne. *Hedges/Tumco: Historic Mining Traditions of Southeastern California*, Burney and Associates Boulder, Colorado 1993

Elling, C. Michael; Van Wormer, Stephen R., *Cultural Resource Inventory of the Hedges/Tumco Gold Mining Town in the Cargo Muchacho Mining District*, Imperial County, California, 1989

Greene, Linda W., *Historic Resource Study: A History of Mining in Death Valley National Monument* (Volume 1), National Park Service Denver, Colorado 1981

Hallaran, Kevin B.; Wilke, Philip, *The Valley View Mine and Mill Site, Castle Mountains*, San Bernardino County, California, 1987

Hector, Susan, *Archaeological Survey and Resource Assessment of the American Girl Mine Project, American Girl Canyon Project Area*, Imperial County, California, 1988

Hector, Susan; Manley, William; Newland, James; Van Wormer, Stephen, *Archaeology of Obregon: Mining Activities in American Girl Canyon*, RECON (Regional Environmental Consultants) San Diego, California 1991

Parr, Robert E.; Swope, Karen K., *An Archaeological Assessment of the Proposed Rand Mining Company Expansion Project, Randsburg, Kern County, California*. Rand Mining Corporation Bakersfield, California 1994

Swope, Karen, *With Infinite Toil: Historical Archaeology in the Beveridge Mining District, Inyo County, California*, University of California Riverside, Riverside, California, 1993

Important mining districts and mines have been identified and documented throughout the California desert region in the documents previously mentioned. The Cargo Mucacho Mountains in eastern Imperial County experienced the earliest mining efforts by Europeans. The Tumco/Hedges mining district in Imperial County, located in the Cargo Mucacho Mountains, is the largest former town and mine in the region. The neighboring Obregon site containing the American Girl and American Boy Mine are included on the NRHP. The most important features of the Tumco/Hedges site are the intact mining mills. These largely intact mining operations are an important historical resource providing insight for scholars into turn of the century mining techniques. The Obregon site is relatively intact with extant structures. Obregon is representative of the best example of large-scale turn of the century industrial mining, and is the only intact gold mining complex in Southern California. The existence of turn of the century mining equipment at the site makes the site particularly useful for future research.

The Julian-Banner mining district is located 50 miles northeast of San Diego in north-central San Diego County. Dry placer mining took place in the district as early as the 1840s, while lode mining began during the 1870s in the region. The first mine to be located in the district was the George Washington and Van Wert. Other mines include the Gold King and Gold Queen operating from 1888-1894. The Golden Chariot mine was the most productive mine in the region producing $700,000 of gold over its lifetime. Most ore deposits were located in shoots less than 100 feet with one running nearly 400 feet. Most of the ore was low grade, requiring significant inputs to extract the ore for modest returns. The deepest working mine was 350 feet. The district while not overly large or productive does however represent some of the earliest

mining activity in the California desert region. It is likely that the district contains significant cultural resources regarding the early mining history of the California desert. There have been only limited studies of the Julian mining district and area. A recent 2005 study in the Julian area only noted a wide variety of scatter materials, and one small stone cabin related to a mining site from the early twentieth century.

The Rand or Randsburg mining district along the San Bernardino Kern County Line located 40 miles east of Mojave was first prospected as early as 1860, but experienced major development when placer gold was discovered in 1893. The largest mine that operated in the district was the Yellow Aster mine which commenced operation in 1895 and expanded in 1901, was a 100 stamp mill. Large scale gold mining continued until 1918, when the silver mining at the Rand Silver mine became dominant. Nearly 40 mines were developed in the district. A 28-mile standard gauge railroad track was built from the site connecting the mine to the Santa Fe line. The mining town of Johannesburg became a critical part of the continued mining efforts of the site. At its height the town had a population of 3,900. This represented significant development of the mining district.

The Cerro Gordo mining area located in Inyo County was first prospected and mined in the 1860s. It was initially formed as part of the Lone Pine Mining District. Cerro Gordo had, by 1870, seen over 900 claims filed for mines in the region. The development of Cerro Gordo was significantly smaller than the Randsburg district. The population grew to only 700 at the height of the mining boom. An 8 mile road along with a 4.5 mile pipeline was built to provide critical services to the small town. The most extensive mine in the district was the mine worked by the Golden Queen mining company which had over 30 miles of underground workings. Its location along the California-Nevada border, facilitated migration population to coastal regions of California which may have left quite a bit of scatter from migrants. The town site remains to be investigated for the available resources it might offer.

3.3.3 Prehistoric and Ethnographic Cultural Resources

Prehistoric archaeological resources are associated with the human occupation and use of the CDD prior to European contact. In California, the prehistoric period began over 12,000 years ago and extended through 1769 with the arrival of the first European settlers. Prehistoric cultural resources may include a variety of sites, deposits, structures, artifacts, rock art, trails, and other traces of Native American human activities and behavior.

Ethnographic resources represent the heritage of particular ethnic or cultural groups such as Native Americans, or African, European, or Asian immigrants. Ethnographic resources may include traditional resource collecting areas (such as hunting sites), ceremonial sites, topographic features, cemeteries or burial sites, shrines, or ethnic structures.

As mentioned previously, there are approximately 10,000 cultural resources located in the CDD which are primarily prehistoric archaeological sites formally recorded through archaeological survey and other investigations. Additionally there are a number of tribal lands and ethnographically important areas present in the CDD. Some AML features may be present on tribal lands, but remediation and closure of these features are not included in the scope of this PEA. Specific prehistoric sites and resources that are present on public lands that would be included within the scope of this PEA would be identified during the site-specific site assessments.

3.4 MINERAL RESOURCES

As described in Section 1.0, there may be more than 13,000 abandoned mines on BLM-administered public lands within the CDD. Currently there are approximately 124 mining operations in the California desert, ranging from small individual "pick and shovel" activities to large open pit mining operations. Being a finite resource, mineral deposits eventually are depleted. Most of the desert has not been extensively explored for minerals.

There are approximately 34 mineral commodities currently being developed in the California desert including gold, silver, copper, lead, zinc, chrome, antimony, nickel, iron, rare earths (lanthanides), uranium, sulphur, talc, and tungsten. Annual production is valued at more than $1 billion, helping to keep California one of the nation's top mineral producing states. California is second in non-fuel mineral production with over 30 non-fuel mineral commodities produced in 2005. These commodities were valued at $3.7 billion dollars and were produced from 820 California mines (California Geological Survey 2010). Some mineral deposits in the CDD are rare and represent the major source of United States and world production. Deposits such as the borax deposit at Boron and the rare earth deposit at Mountain Pass represent nearly 100 percent of U.S. production of these important minerals. Important sodium and calcium minerals, as well as world class deposits of gypsum and specialty clay minerals are also being developed in the CDCA California Desert Conservation Area (CDCA). Important gold production validates California's place as a world class producer of this important metal. Additionally, hazardous minerals are also found in the CDD including asbestos, radon, and mercury. The California Geological Survey and the California Department of Health Services monitor activities and provide advice related to environmental and health issues associated with these hazardous minerals (California Geological Survey 2010).

3.5 PALEONTOLOGICAL RESOURCES

Many geologic formations within the CDD are known to contain paleontological resources which have also been developed for mineral resources. Paleontological resources are the fossilized evidence of past life found in the geologic record. Such resources include bones, teeth, body remains, traces, or imprints of plants and animals. Despite the volume of sedimentary rock deposits preserved worldwide and the large number of organisms that have lived through time, preservation of plant or animal remains as fossils is an extremely rare occurrence. Because of the infrequency of fossil preservation, fossils, particularly vertebrate fossils, are considered to be nonrenewable resources. Because of their rarity and because of the scientific information they can provide, fossils are highly significant records of ancient life. Fossils can provide information about the interrelationships of living organisms, their ancestry, development, and change through time, and their former distribution.

All fossils offer scientific information, but not all fossils offer significant scientific information. Among paleontologists, fossils generally are considered scientifically significant if they are unique, unusual, rare, diagnostically or stratigraphically important, or add to the existing body of knowledge in a specific area of science. Significant fossils include all vertebrate fossil remains (body and trace fossils) and plant and invertebrate fossils determined to be scientifically unique. Although experienced paleontologists generally can predict which formations may contain fossils and what types of fossils will be found based on the age of the formation and its depositional environment, predicting the exact location where fossils will be found without field surveys is usually not possible.

All vertebrate fossils, and in rare cases, invertebrate or plant fossils are deemed significant under current BLM policy. The significance of invertebrate or plant localities is treated on a case-by-case basis, though when cases are identified, the geological characteristics of the surrounding region may need to be considered to determine the possible areal extent of the fossil bearing units.

The BLM has developed classification guidelines for the assessment and mitigation of potential impacts to paleontological resources. This classification is based on the probable fossil yield classification (PFYC; Instruction Memorandum No. 2009-011). The classification is based largely on how likely a geologic unit is to contain vertebrate and significant invertebrate fossils. Most of the CDD is classified as PFYC Class 2 based on the geology of the area and from existing resource data. PFYC Class 2 includes units not likely to contain vertebrate fossils or significant invertebrate fossils.

The geology of the CDD consists of broad ranges containing intrusive igneous rock and in many cases metamorphosed volcanic, sedimentary, and igneous rocks. Volcanic and igneous rocks are not conducive to fossil accumulations. Most hardrock mine features are generally associated with volcanic and igneous rocks. On occasion metamorphosed sedimentary and sedimentary units have both marine and non-marine fossils within their units. Potential for undiscovered paleontological resources in the project areas is considered low.

3.6 SOILS

The majority of the CDD lies within the Mojave and Colorado Deserts. The Mojave Desert comprises widely separated short mountain ranges separated by desert plains. It contains isolated mountains, plateaus, alluvial fans, playas, basins, and dunes. Elevation in the Mojave Desert ranges from 300 ft below sea level to 11,000 ft above sea level (-91 to 3,344 m). Within the Colorado Desert there are alluvial slopes, basin, dunes, and delta plain (Gulf of California). Elevation in the Colorado ranges from 230 feet below sea level to 1,000 ft (-70 to 304 m).

Two major processes shape the desert landscape: 1) erosion by wind and water and 2) deposition of aeolian (windblown) or fluvial (waterborne) sediments. Erosion is a natural and important process in the desert. Due to the lack of vegetation in desert systems, erosion is a major cause of changes in land forms.

Erosion also affects biostatic processes, such as nutrient cycling and biogeochemical cycling in soil and water. Factors affecting temporal and spatial variation in erosion are rainfall, vegetation, soils, and slope. Erosion by water results in high sediment loads in desert streams. Sediment is derived from direct contributions from slopes and materials from the bed and banks. Large streams tend to carry more of the slope materials, small streams more bed and bank material. Sediments are largely sand and gravel with little silt, clay, or large debris. Soils in the area are shallow and rocky and susceptible to accelerated erosion from wind and water especially when the surface crusts have been disturbed.

Soils located within abandoned mine land footprints are characterized as disturbed soils. Any soil in these areas is typically a mix of broken rock, excavated soil, and or other mining debris (such as brick, concrete, wood, and steel). The routes used to access abandoned mine locations are also characterized by disturbed soils. The BLM has observed, in general, that mine sites are sparsely vegetated.

Soils in the Mojave and Colorado Deserts include aridisols and entisols in combination with thermic and hyperthermic soil temperature regimes and aridic soil moisture regime on foothills and valleys. Some low-lying areas in the valleys have salt-affected soils. Aridisols and entisols in combination with mesic and frigid soil temperature regimes, and aridic and xeric soil moisture regimes occur in the mountains.

3.7 WATER RESOURCES

Mines can serve as a passageway from which water exchange can be facilitated between surface and groundwater sources.

3.7.1 Surface Water

Permanent surface waters in southern California are limited to man-made reservoirs and perennial streams that drain large mountain ranges. The Metropolitan Water District (MWD) of Southern California manages five reservoirs in the CDD area: Sherwood Lake, Lake Perris, Lake Mathews, Diamond Valley Lake, and Lake Skinner. California has been in a drought for the past three years. The Department of Water Resources (DWR) has increased its 2010 water allocations from 5 to 50 percent due to unusual late season storms; however, state water deliveries remain limited. The average allocation over the past ten years has been 68 percent of requests (DWR 2010).
Most stream channels within the arid areas of the CDD are intermittent and flow, sometimes with intensity, only during wet periods or heavy precipitation events. Mine features located within channels or where water could localize can occasionally fill with water. This water may dissipate through surface flow or seep into the ground and discharge to the groundwater.

The unique environment around mines can also contribute to the development of vernal pools. Vernal pools are shallow bodies of water with no above ground outlet that contain water only during part of the year. Such areas could be classified as seasonal or perennial wetlands under California regulations.

3.7.2 Ground Water

The CDD is located immediately south of the Central Valley Aquifer System and the Great Basin Aquifer System. The western area of the CDD is underlain by Coastal Basin Aquifers (USGS 2010). The following Groundwater Basins are contained within the CDD: Mojave, Cadiz Valley, Eastern and Western Metropolitan Water District, Coachella Valley, Upper Chuckwalla, Hayfield Valley, and Imperial Valley (Pulido-Velazquez 2004). The geology of the area is predominantly Cenozoic continental deposits and Mesozoic granitic rock (USGS 2010) in which significant aquifers would not be expected and have not been detected. Recharge to ground water occurs during periods of precipitation from runoff along stream courses and washes.

Groundwater seeps may be present near the surface expression of mine features. Such seeps can create permanent or semi-permanent pools and may result in the development of seasonal, perennial, or permanent wetlands.

3.8 NOISE AND VIBRATIONS

Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is generated by pressure waves in air. Differences in pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit that expresses the ratio of the sound pressure level being measured to a standard reference level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Sound pressure waves may be of various frequencies. The human ear only responds to a limited range of frequencies. These frequencies range from 20 hertz (Hz) to 20,000 Hz, but the human ear is most sensitive to frequencies between 1,000 to 4,000 Hz (Smith 1997). When measuring noise levels, those frequencies to which the human ear does not respond must be filtered out. The procedure referred to as "A-scale" weighting best approximates the frequency response of the human ear, measuring only those sounds humans are capable of hearing. Sound levels measured on the A-scale are designated by the term dBA

The AML sites are located in areas of the CDD that are predominantly undisturbed desert with a significant number of designated special use areas (Section 3.13). Many of the AML sites are accessible only by foot, pack mule, or helicopter. Those sites that are accessible by local roads are not in urban or developed locations and are not in close proximity to major highways or thoroughfares. Therefore, the current noise and vibration conditions at these sites are those associated with normal vehicular traffic on access roads and OHV recreational vehicles. Title 13 of the California Code of Regulations specifies an exhaust noise level of less than 95 dBA (CHP 2010). Off-highway vehicles in California are required to maintain noise levels below 96 or 101 dbA depending on the year of manufacture (About.com 2010). Dune buggies, motorcycles, four-wheel drive vehicles, and all terrain vehicles are approved for use in various locations throughout the CDD except in Wilderness areas or WSAs (Exploring the Southwest Desert USA 2010). The main concern is the remoteness of the AML locations. Background noise levels are anticipated to be very low, therefore magnifying the impact of any noise produced by the closure process. Ambient noise in a remote desert area is expected to be as low as 35 to 50 dBA.

3.9 AIR QUALITY

Air quality is defined in a regulatory sense in terms of attainment status relative to national and state standards and other factors. Air quality can be affected by air pollutants produced by mobile sources, such as vehicular traffic, aircraft, and non-road equipment; and fixed or immobile facilities, referred to as "stationary sources." Stationary sources can include industrial stacks and vents.

Air pollutants have the potential to affect several components of the environment including, but not limited to humans, wildlife, fish, and vegetation. The Clean Air Act (CAA) established the National Ambient Air Quality Standards (NAAQS) for concentrations and durations of pollutants which may cause adverse health effects. National primary ambient air quality standards define levels of air quality, with an adequate margin of safety, to protect public health. National secondary ambient air quality standards define levels of air quality, with an adequate margin of safety, to protect the public welfare from any known or anticipated adverse effects of pollutants.

The CDD area is located within the following California air basins: Mojave Desert, Salton Sea, South Coast, and San Diego County (California Air Resources Board [CARB] 2010). Air quality in the CDD is affected by the amount of contaminants emitted into the atmosphere, the topography, and meteorological conditions. In the eastern Colorado Desert eco-region, stable atmospheric conditions, low mixing heights, and light winds during evening and morning hours result in accumulation of contaminants. In addition, the Los Angeles Air Basin contributes photochemical smog, such as ozone (O_3), to most of the CDD through long-distance transport. The most significant air quality issues in the CDD are ozone, fugitive dust, and haze.

Photo 8. Abandoned mines, mill site, and a mining cabin located near the Turtle Mountain Wilderness (photo taken by S. White 2010)

Air quality throughout the CDD is good much of the time. There are, however, times that the area does not meet air quality standards due to locally generated and, more commonly, transported pollutants (from the Los Angeles Basin). Currently all of the Northern and Eastern Colorado Desert (NECO) planning area is in non-attainment with both federal and state ambient air quality standards for ozone under NAAQS (NECO Coordinated Management Plan [CMP]/Final Environmental Impact Statement [FEIS] 2002). Additionally, areas of the Northern and Eastern Mojave (NEMO) planning area, are in nonattainment for ozone and particulate matter less than 10 microns in size (PM_{10}), under the state and/or national standards (NEMO CMP/FEIS 2002). Ozone is produced in the atmosphere through a series of chemical reactions. Ozone is an irritant of the respiratory system and inhibits proper functioning of the lungs. The primary sources of ozone in the CDD are vehicle traffic traveling through the region and transported ozone from the Los Angeles Basin. The Imperial County State Implementation Plan (SIP) identifies sources of emissions and control measures to reduce emissions. Federal actions within this area are subject to conformity determinations under 40 CFR 93.
Local pollution in the desert is primarily caused by particulate matter. The primary contributor of PM_{10} is fugitive dust, occurring both naturally in a desert environment and from human causes, such as mining operations, OHV use, and grazing.

Visibility is generally referred to as the relative ease with which objects can be seen through the atmosphere under various conditions. Particulate matter and gases introduced into the atmosphere either absorb or scatter the light, reducing the amount of light a person can receive from a viewed object. Visibility is impaired by dust (especially fine particulates such as PM_{10}) and sulfates. Impact to visibility from pollutants transported from the major urban centers takes the form of widespread regional haze which frequently impairs visibility (NECO/FEIS 2002).
The NEMO planning area is currently unclassified for visibility reducing particles (VRP) under both national and state ambient air standards. Particles between 0.1 and 1.5 microns diameter are the most effective in reducing visibility. This range of particle sizes is a subset of the fine PM_{10} particles. Soot particles in particular are effective in reducing visibility. Small nitrate and sulfate particles may also substantially reduce visibility. Nitrogen dioxide and water droplets can reduce visibility. Many of the VRP form in the atmosphere downwind from sources of emissions (NEMO /FEIS 2002).

EPA has also identified certain Wilderness areas and National Parks as Class I airsheds. These areas have stricter nondeterioration standards and mitigation requirements. There are currently no Class I airsheds in or adjacent to the NEMO planning area, but the National Park Service has petitioned EPA for reclassification of airsheds in the Mojave National Preserve and Death Valley National Park to Class 1 as a goal. There is concern for visibility-reducing particles and PM_{10} precursor emissions in most of Southern California, including the NEMO planning area (NEMO CMP/FEIS 2002).

3.10 VISUAL RESOURCES

The CDD is entrusted with the care of public lands containing many outstanding scenic landscapes. The BLM accomplishes this through its Visual Resource Management (VRM) system, a system which involves inventorying scenic resources and establishing management objectives for those resources through the resource management planning process.
The Visual Resource Inventory (VRI) system (BLM Manual H-8410-1), a part of Visual Resource Management, is based on objective ratings of the following seven categories:

- Landform
- Vegetation
- Water
- Color
- Adjacent Territories
- Scarcity
- Cultural Modifications

Each category receives a numerical rating between -5 and 5, and the total score is the sum of the rating for that visual resource component. The scene's total score is tabulated, and used to determine the VRI classification (BLM Manual H-8410-1):

- **Class I** – This is the highest value class, and the objective of this class is to preserve the existing character of the landscape. While this classification provides for natural ecological changes, it does not prohibit very limited management activity. The change caused to the landscape by any action should be very low and must not attract attention. It is also dictated by the VRM document that all special areas (Natural Areas, Wilderness Areas, WSAs, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and ACECs) are placed in this classification.
- **Class II** – The objective of this class is much the same as Class I, to preserve the existing character of the landscape, with a very low level of change due to any actions. Management activities are allowed to be seen, but must not draw the attention of a casual passerby. Any changes must conform to the basic elements of form, line, color and texture found in the natural features of the characteristic landscape.
- **Class III** – The objective of this class is to at least partially retain the existing character of the landscape. A moderate change to the characteristic landscape is allowed, and management activities may attract the attention of a casual observer, but must not dominate the view. Changes should imitate the basic elements of the natural features of the landscape.
- **Class IV** – The objective of this class is to provide for major management activities that involve major modifications to the characteristic landscape. The modifications may dominate the view and be the major focus of a viewer's attention.

Also considered in the inventory is sensitivity level. This is a measure of the public's concern for the landscape or scenic feature. Public lands are assigned classifications of high, medium or low sensitivity depending on the various indicators of public concern. These indicators are as follows:

- Type of users – who uses the scenic landscape or property such as recreational or routine viewers;
- Amount of use – how much the area is used, and how many viewers there are;
- Public interest – if the area is of visual concern to local, state or national groups. Public controversy surrounding possible changes should be considered;
- Adjacent land uses- how the landscape or area of concern relates to its surrounding areas;
- Special Areas – Special areas such as Natural Areas, Wilderness Areas, WSAs, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and ACEC have special requirements and considerations; and
- Other factors – any other information about the area that may affect the visual concerns associated with it. Research and studies are useful in this indicator.

Before any actions can occur on BLM land, each site must be rated through the VRI system.

3.11 RECREATION

Outdoor recreation is integral to the American lifestyle and is inseparably linked to the Western quality of life. CDD-managed lands and resources contribute to the social fabric and identity of many California rural communities. Driven by a growing population and rising international visitation, the public demand for recreation on CDD-managed public lands continues to intensify. This has led to greater recreational use and to more diverse forms of such use – not to mention an increase in user conflicts and controversy over the most appropriate uses and management of abandoned mines.

With more than 11 million acres of public lands within the CDD, people enjoy countless types of outdoor activities including camping, hunting, fishing, hiking, horseback riding, hang-gliding, OHV driving, mountain biking, birding and wildlife viewing, photography, climbing, skiing, snowshoeing, snowmobiling, and visiting natural and cultural heritage sites. Several federal and state parks are located in the CDD. These are used for preservation as well as recreation purposes.

The BLM is a partner with the California Department of Fish and Game, the California Department of Transportation, California State Parks, the California Travel and Tourism Commission, the National Park Service, the U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, the U.S. Fish and Wildlife Service, the U.S. Department of Agriculture (USDA) Forest Service (Watchable Wildlife, Inc. [WWL] 2010; California Watchable Wildlife [CA WWL] 2010).

There are several "Watchable Wildlife" sites located throughout the CDD. Watchable Wildlife, Inc. is a non-profit organization in the United States and Canada which encourages wildlife observation as an economic and conservation enterprise. The Watchable Wildlife mission is "to help communities and wildlife prosper." The organization seeks to help communities experience the benefits of nature-related recreation while also conserving native wildlife in

natural habitats. The California Watchable Wildlife Project is a branch of the larger organization. The BLM is a partner in the California Watchable Wildlife Project. Other project partners include a number of state and national organizations including the California Coastal Conservancy, the California Department of Fish and Game, the California Department of Transportation, California State Parks, the California Travel and Tourism Commission, Defenders of Wildlife, Ducks Unlimited, the National Park Service, Nature Tourism Planning, the U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, the U.S. Fish and Wildlife Service, the U.S. Department of Agriculture (USDA) Forest Service (WWL 2010; CA WWL 2010).

The number of other recreational sites that exist in the CDD preclude preparation of a comprehensive list, however, the major National Parks, Monuments, Forests, and Reserves; State Parks and Recreation Areas; and Watchable Wildlife Sites located within the California Desert District are shown on Figure B-4 (Appendix B) and include:

National Parks, Monuments, Forests, and Reserves

- Angeles National Forest
- Cabrillo National Monument*
- Cleveland National Forest
- Death Valley National Park*
- Joshua Tree National Park*
- Mojave National Preserve
- San Bernardino National Forest
- Santa Rosa and San Jacinto Mountains National Monument*
- Sweetwater Marsh Unit of San Diego Bay National Wildlife Refuge*
- Tijuana Slough National Estuarine Research Reserve*

State Park/Recreation Area

- Anza-Borrego Desert State Park
- California Citrus State Historic Park
- Crystal Cove State Park*
- Cuyamaca Rancho State Park
- Heber Dunes State Vehicular Recreation Area
- Indigo Hills Palms
- Lake Perris State Recreation Area
- Mount San Jacinto State Park*
- Ocotillo Wells State Vehicular Recreation Area*
- Palomar Mountain State Park
- Picacho State Recreation Area
- Providence Mountains State Recreation Area
- Red Rock Canyon State Park
- Salton Sea State Recreation Area
- San Pasqual Battlefield State Historic Park
- Silverwood Lake State Recreation Area

Select Additional Recreational Areas

- Audubon Kern River Preserve*
- Big Morogongo Canyon Preserve*
- Coachella Valley Preserve*

- Little Lake Overlook*
- Palm to Pines Scenic Byway*
- Upper Nerport Bay Ecological Reserve and Regional Park*

* Watchable Wildlife Site

The CDD increasingly manages recreation and visitor services in a manner that involves both public and private partners – a collaborative approach that generates benefits for recreationists, nearby residents, and local communities. This type of cooperation is reflected in interpretive programs, recreation infrastructure, and other management actions. Among the important management objectives are providing universal access; accommodating the growing diversity of recreational demands; reaching out to groups of non-users; serving traditional users; implementing programs to re-engage the nation's youth in the great outdoors; sponsoring educational programs to mitigate conflicts between recreationists, and other public land users; and adopting modern business practices that efficiently provide recreation opportunities.

3.12 HAZARDOUS AND SOLID WASTE

Wastes generated from mining activities and, therefore, potentially present at abandoned mines include waste rock, mine tailings, mine drainage water (groundwater), surface impoundments, processing chemicals, slag, heap piles, and other operational wastes (CEPA 2006). Groundwater and/or surface water may collect within the abandoned mines and become contaminated with metals resulting in acid mine drainage (Trout Unlimited 2010). Stockpiled waste rock and mill tailing piles are typical sources of potential environmental problems at AML sites. These solid wastes may also contain minerals and metals and be acid generating.

The contaminants present in mining waste are determined by the following:

- The chemical composition of the minerals which make up the ore and surrounding rock being mined;
- Mining methods;
- Ore processing methods, including chemicals used to process the ore (e.g., mercury and cyanide used in gold recovery);
- Mine waste disposal methods; and
- The interaction of natural processes with mine wastes (CEPA 2006).

Additionally, the tailings and other wastes may contain chemical agents used in the mining process (Trout Unlimited 2010) including explosives, fuels, solvents and lubricants (CEPA 2006). AML sites presenting waste concerns would not be included in the scope of this PEA.

The California desert has been and continues to be an important place for military training activities. Abandoned mines are located within the 18,000 square mile Desert Training Center/California - Arizona Desert Maneuver Area, used from 1942 through 1944 for military servicemen training and weapons testing. During the cold war in the 1960s, the largest military training exercise simulating a nuclear war, Operation Desert Strike, was carried out in the California desert. There have been other similar, but often smaller, exercises carried out in the desert over the past 60 years. Unexploded ordnance associated with military training area may be encountered in the project area, but none have been observed in previous surveys within abandoned mines.

3.13 FIRE PROTECTION

In 2008, on BLM managed lands, there were 124 reported wildfires, burning approximately 26,938 acres, and the five-year average for the entire State of California is 7,871 fires, burning approximately 270,000 acres (California Department of Forestry and Fire Protection 2008). The California Fire Alliance provides statewide oversight for fire protection. Made up of agencies' top officials and the California Fire Safe Council, the Alliance sets policy, coordinates development of Community Wildfire Protection Plans, and provides grants to implement plans.

The primary fuel for desert wildfires in the Southwest is invasive grasses such as red brome, Mediterranean grass, and buffelgrass. After wet winters, these invasive grasses grow providing increased amount of fuel and ,therefore, larger wildfires. (Southwest Climate Change Network 2008).

It is BLM policy to take all necessary actions to protect human life, the public lands and the resources and improvements on these lands through the prevention of wildfires. The BLM establishes fire prevention orders to assist with wildland fire prevention. These efforts compliment and support state and local wildfire prevention efforts throughout the CDCA. Under Order Number CA-060-20 10-01, the BLM has established year-round fire restrictions on all public lands of the CDD for the following:

- The use or possession of fireworks.
- The possession or discharge of a firearm using incendiary, tracer, steel core, or armor piercing ammunition.
- No person shall burn, ignite or cause to bum any tire, petroleum product, wires, magnesium, or any other hazardous or explosive materials
- All off-road vehicles being operated on public lands must be equipped with a properly installed spark arrester meeting the requirements specified in the order.

Seasonal restrictions are also defined within the order including the end of fire season and stage restriction seasons.

3.14 DESIGNATED SPECIAL USE AREAS

3.14.1 Wilderness and Wilderness Study Areas (WSAs)

Photo 9. Installation of a cupola over the top of a shaft (photo taken by S. White,2009)

Congress defined wilderness as being an "area where the earth and its community of life are untrammeled by man..." Ensuring these wild places remain for present and future generations is important. Congress has designated areas of public lands in CDD as part of the National Wilderness Preservation System. The CDD also manages WSAs to maintain their wilderness qualities until a Wilderness classification decision is made by Congress. Conditions of designated Wilderness areas or WSAs include:

- They must be in a generally natural condition.
- They must have outstanding opportunities for solitude or a primitive and unconfined type of recreation.
- They must be at least 5,000 acres or large enough to preserve and use as wilderness.
- They may also contain ecological, geological, or other features of scientific, scenic, or historical value.

The BLM has a statutory obligation to maintain these wilderness characteristics in all actions conducted within all Wilderness areas including AML remediation closure. For example, use of mechanized equipment or motorized vehicle access is normally a prohibited activity in Wilderness areas or WSAs. This restriction may limit the BLM's ability to remediate a physical safety hazard at certain AML sites. The BLM does have some latitude to allow some levels of mechanized equipment use and motorized vehicle access in Wilderness areas or WSAs to remediate an immediate threat to public health and safety. Table 5 presents a summary of the number of Wilderness and WSAs managed by BLM and the total acreages within each Field Office area. Figure B-5 (Appendix B) shows the physical location of Wilderness and WSAs.

Table 3. Wilderness areas or WSAs Managed by CDD and its Field Offices

BLM CDD Field Office	Number of Wilderness Units Managed	Acres Managed
El Centro	10	250,140
Palm Springs/South Coast	11	622,243
Barstow	14	551,736
Needles	18	1,381,496
Ridgecrest	16	559,791
Desert District Total	69	3,365,406

3.14.2 Areas of Critical Environmental Concern (ACECs)

Area of Critical Environmental Concern (ACEC) designations highlight areas where special management attention is needed to protect and prevent irreparable damage to important cultural, biological, or scenic resources (including historical sites, fish or wildlife resources, or other unique or fragile natural systems or processes); or to protect human life and safety from natural hazards (BLM Manual 1613 – Areas of Critical Environmental Concern). Each individual ACEC has a plan that guides use and occupation of the surface for remediation purposes.

In the CDD there are 87 ACECs (Table 6) totaling approximately 2,880,000 acres. The ACECs include some of the Watchable Wildlife Sites and HMAs discussed in Sections 3.14.1 and 3.14.2, respectively. Within the CDD there are approximately 800 known mines and prospects within these ACECs (Figure B-6, Appendix B). Each individual mine may include one or more features (Appendix A).

Table 4. ACECs within the CDD

ACEC NAME	CULTURAL	BIOLOGICAL	SCENIC
Afton Canyon	Y	Y	
Alligator Rock	Y		
Amargosa River		Y	
Amboy Crater National Natural Landmark			Y
Barstow Woolly Sunflower		Y	
Bedrock Spring	Y		
Big Morongo Canyon		Y	
Bigelow Cholla		Y	
Black Mountain	Y		
Calico Early Man Site	Y		
Cedar Canyon		Y	
Cerro Gorde	Y	Y	
Chemehuevi		Y	
Christmas Canyon	Y		
Chuckwalla		Y	
Chuckwalla Valley Dune Thicket		Y	
Clark Mountain	Y	Y	Y
Coachella Valley Fringe-toed Lizard		Y	
Corn Springs	Y	Y	Y
Coyote Mountains Fossil Site	Y		
Gold Basin/Rand Intaglios	Y		
Great Falls Basin/Argus Range		Y	
Halloran Wash	Y		
Harper Dry Lake		Y	
Indian Pass	Y		
In-Ko-Pah Mountains	Y	Y	
Ivanpah Valley		Y	
Jawbone/Butterbread	Y	Y	
Johnson Canyon		Y	
Juniper Flats	Y		
Kingston Range	Y	Y	Y
Kuchamaa	Y		
Lake Cahuilla	Y		
Last Chance Canyon	Y		
Lower Carson Sl		Y	
Manix	Y		
Marble Mountain Fossil Bed	Y		
Mesquite Hills/Crucero	Y		
Mesquite Lake	Y		
Million Dollar Spring		Y	
Plank Road	Y		
Potrero		Y	
Rainbow Basin/Owl Canyon	Y		
Rodman Mountains Cultural Area	Y		
Rose Spring	Y		
Saline Valley	Y	Y	
Salt Creek Hills	Y	Y	
San Sebastian Marsh/San Felipe Creek	Y	Y	
Sand Canyon		Y	
Santa Ana River Wash		Y	
Santa Margarita Ecological Reserve		Y	
Shadow Valley		Y	
Short Canyon		Y	
Soggy Dry Lake Cresote Rings		Y	
Squaw Spring	Y		
Steam Well	Y		
Surprise Canyon	Y	Y	Y
Table Mountain	Y	Y	
Trona Pinnacles	Y		
Turtle Mountains NNL			Y

Table 4. ACECs within the CDD (Continued)

ACEC NAME	CULTURAL	BIOLOGICAL	SCENIC	ACEC NAME	CULTURAL	BIOLOGICAL	SCENIC	ACEC NAME	CULTURAL	BIOLOGICAL	SCENIC
Cronese Basin	Y	Y		Mojave Fishhook Cactus		Y		Upper Amargosa		Y	
Darwin Falls/Canyon		Y	Y	Mopah Spring	Y		Y	Upper Johnson Valley Yucca Rings		Y	
Dead Mountains	Y			Mountain Pass Dinosaur Trackway	Y			Warm Sulfur Springs		Y	
Denning Spring	Y			Mule Mountains	Y			West Mesa	Y	Y	
Desert Lily Preserve		Y		North Algodones Dunes NNL		Y	Y	Western Rand Mountains		Y	
Desert Tortoise Research Natural Area		Y		Palen Dry Lake	Y			Whipple Mountains	Y		
Dos Palmas		Y		Pattons Iron Mountain Divisional Camp	Y			White Mountain City	Y		
East Mesa	Y	Y		Pilot Knob	Y			Whitewater Canyon	Y	Y	
Fossil Falls	Y			Piute-Fenner Va		Y		Yuha Basin	Y	Y	

4.0 ENVIRONMENTAL IMPACTS

Potential environmental impacts related to the BLM CDD AML remediation and closure process are addressed in this section. As discussed in Section 2.2, the Proposed Action is for BLM to establish and implement a step-by-step, comprehensive assessment and closure process to remediate dangers to public health and safety associated with AML located on land managed by the CDD. The comprehensive process would include consideration and evaluation of potential environmental impacts to the environment and cultural resources associated with possible closure techniques. The CDD AML remediation and closure process would include the following steps:

1. Establish Evaluation Team
2. Determine Site Accessibility
3. Conduct Site Assessment
4. Develop Remediation Plan
5. Implement Remediation Actions
6. Perform Project Closure and Monitoring

The impacts are grouped and presented according to resource area as described in Section 3.0. Where applicable, mitigation measures to resolve potential impacts are discussed in the respective impact sections followed by an analysis of residual impacts remaining after implementation of mitigation. Within the respective resource areas, impacts are analyzed with respect to the No Action Alternative and the field portions of the remediation and closure process during which physical impacts would occur. These field steps include:

- Determining Site Accessibility (step 2)
- Conducting Site Assessments (step 3)
- Implementing Remediation Actions (step 5)
- Project Closure and Monitoring (step 6)

4.1 TRANSPORTATION

4.1.1 Impacts Associated with the No Action Alternative

Under the No Action alternative, there would be potential adverse impacts to transportation resources because under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Potential adverse impacts would vary by AML site. Impacts could include development of new tracks in previously natural areas which could be interpreted as authorized roads by desert visitors potentially resulting in compounded impacts. Other impacts could include damages to existing roads from transportation of heavy construction machinery or trucks. Therefore, potential impacts to transportation resources as a result of the no action alternative could be minor to significant depending on the location of the impacts and the surrounding area.

4.1.2 Impacts Associated with the Proposed Actions

4.1.2.1 Impacts Associated with Determining Site Accessibility

The first step in the remediation and closure process would be to evaluate potential access routes to allow for the movement of equipment, construction materials, and personnel to reach

the respective AML sites. Evaluation and selection of the access routes would be determined with consideration of the route designations as discussed in Section 3.1 (Transportation).

To the extent possible, access to mining sites shall utilize existing routes-of-travel designated "open" in land use plans. In these areas there would be no new impacts to transportation resources beyond those already present.

In situations where vehicles must move from the open route of travel across limited routes or undisturbed land, there is a potential for impacts to known and/or undiscovered environmental and cultural resources at or near the surface from BLM construction traffic. Impacts could also occur from non-BLM desert visitors if those individuals see the new tracks and interpret them as an accessible roadway. As described in Section 3.1, vehicle tracks in the desert persist for long periods of time and may appear to be useable roadways. Potential impacts resulting from off-route access could be significant if such impacts occur in restricted areas of ACECs, Wilderness, or WSAs due to the sensitive nature of these environments. Off-route access in these areas could cause permanent damage to environmental and/or cultural resources that cannot be mitigated.

Access to some sites may require vehicles to travel very short distances of less than 100 feet off an existing route. Additional off-route travel off an existing route that is designated open may be allowed under the stopping, parking, and camping restrictions of the land use plan for that governs that open route. Generally this distance is zero to 300 feet. The evaluation team would determine these distances based on the identification of routes to be used for accessing the individual project sites. Appropriate off-road distances would be stipulated in the Remediation Plan.

Resource specific impacts associated with vehicle access are analyzed in detail in the resource specific impact analysis in subsequent sections of this PEA. These resource specific impacts associated with transportation issues are summarized here. When transportation activities occur along dirt or gravel roadways, fugitive dust emissions could occur due to the soil disturbance when soil moisture levels are low as is frequently the case in the desert, negatively affecting air quality on a very short term basis. Support vehicle use on the access routes and off-route could generate small amounts of PM_{10} emissions and could carry soils onto the paved roads which would increase entrainment PM_{10} emissions. A short-term increase in fugitive dust during wind storms could occur due to the soil disturbance as a result of the proposed actions. Other impacts due to access could include wildlife displacement and fatality and cultural resource degradation due to vehicle travel. Leaks or equipment malfunction from vehicles could result in impacts to the environment and wildlife.

To mitigate potential impacts to environmental and cultural resources associated with vehicle access, the following mitigation measures would be implemented. Site-specific conditions would determine the degree to which these mitigation measures would be implemented. The possible mitigation measures include:

- Vehicle use in association with the proposed actions would adhere to the guidelines described in Section 3.1.
- All vehicles would stay on designated or open routes of travel to the extent possible.
- In Wilderness Areas and WSAs, vehicle traffic would be prohibited and all remediation activities would be conducted on foot initiating from the nearest open routes.
- No construction of new roads would be authorized.

- Where cross-county vehicle access from the approved route of travel to the mine feature is necessary, access would be limited to one round-trip transit.
- Where no other routes are available, if necessary, minor repairs of existing roads would be authorized.
- Borrow used to fill depressions along existing routes of travel to either facilitate vehicle access or to repair and restore natural areas following implementation of the remediation and closure activities would be excavated from areas already disturbed by previous mining activity.
- At locations where there is rock shoring along the access road, it would be left intact and undamaged.
- Environmental and cultural features identified through the site assessment process would be avoided.
- Vehicles and equipment would be inspected for leaks and maintenance issues prior to accessing the site to minimize the potential for spills of fluids, oils, and gasses.
- Vehicles and equipment would be cleaned prior to accessing the site to prevent the spread of invasive plant species.
- Limit vehicle speeds to 25 miles per hour on unpaved designated routes.
- Limit vehicle speeds to 5 miles per hour for off-route access.
- Curtail activities when wind speeds exceed 25 miles per hour.
- Conduct equipment operations during daylight hours using only the equipment necessary to complete the scheduled tasks.
- Conduct operations during weekdays rather than weekends or other high use periods.
- The area of disturbance would be confined to the smallest practical area, considering topography, placement of facilities, location of burrows, public health and safety, and other limiting factors.
- All tracks created on undisturbed ground will be raked or swept following completion of site remediation and closure activities.

Given the number of vehicles that would be used to access each individual site, individual site project durations of generally less than 2 days, the overall size of the project area, and implementation of the suggested mitigation measures, actual impacts from remediation activities would be anticipated to be minor and temporary. No residual impacts associated with transportation access would be anticipated in association with the proposed actions.

4.1.2.2 Impacts Associated with Conducting Site Assessments

Impacts with respect to transportation resources or vehicle accessibility would not be anticipated in conjunction with the site assessment process. The majority of the activities engaged in during the site assessment process would be walking surveys conducted by a small number of field crew. The field crew conducting these surveys would be environmental and cultural resource specialists trained in recognizing environmental and cultural resources for the purposes of identifying potential impacts to these resources as a result of the project activities. As such, these specialists would conduct the field surveys with the goal of avoiding potential impacts to the extent possible. The walking surveys would not be of duration, or cover ground in a repetitive way, such that new pathways or trails would be created.

To gain site access to the AML sites, field crews would utilize existing roadways following the guidelines delineated in Section 3.1. Where existing roadways are not available to reach the AML features, field crews would park vehicles within approved distances along the road side and then walk to the feature in question as discussed in Section 4.1.2.1. Following completion

of project activities, all off-road remediation activities, as stipulated in Section 4.1.2.1, would be implemented to mitigate potential impacts. With the implementation of such mitigation measures, residual impacts associated with the site assessment process would not be anticipated.

4.1.2.3 Impacts Associated with Implementing Remediation Actions

Transport of the equipment and materials required to implement the remediation actions would not be anticipated to create any additional impacts beyond those discussed in Section 4.1.2.1. The mitigation measures outlined in that section would apply during all stages of project activities in which motorized vehicles are employed. With the implementation of such mitigation measures, residual impacts associated with the implementation of remediation actions would not be anticipated.

4.1.2.4 Impacts Associated with Project Closure and Monitoring

Activities associated with project closure and monitoring would be similar to those discussed in Section 4.1.2.2. Therefore, impacts associated with project closure and monitoring would also be similar to the impacts outlined in Section 4.1.2.1. The mitigation measures outlined in that section would apply during all stages of project activities in which motorized vehicles are employed. With the implementation of such mitigation measures, residual impacts associated with the project closure and monitoring process would not be anticipated.

4.2 BIOLOGICAL RESOURCES

4.2.1 Impacts Associated with the No Action Alternative

Under the No Action alternative, there could be potential adverse impacts to biological resources because under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Potential adverse impacts would vary by AML site and depending on the nature of wildlife use of the feature and the presence of threatened and endangered species in and around the area. Impacts could include injury of wildlife during vehicle transit and site operations from vehicle use or elevated noise levels. Other impacts could include permanent loss of habitat through closure of AML features at which biological surveys were not conducted. Additionally, current conditions include the possibility of wildlife becoming injured or trapped in the mines. Therefore, potential impacts to biological resources as a result of the no action alternative could be minor to significant depending on the location of the impacts and the nature of wildlife use in the AML feature and the surrounding area.

4.2.2 Impacts Associated with the Proposed Actions

4.2.2.1 Impacts Associated with Determining Accessibility

Transportation activities during the closure and remediation of the AML sites would cause the majority of impacts to wildlife and vegetation. The proposed action assumes access to the AML sites would be obtained using existing routes. However, should access to the sites need to be extended outside of the boundaries of the existing routes, potential impacts to biological resources could occur. Potential direct impacts would occur if habitat were destroyed by vehicular traffic or if animals were struck by vehicles. In addition, desert ecosystems are very sensitive to erosion, therefore potential indirect impacts associated with vehicular traffic would

include potential washout of areas adjacent to vehicular routes after heavy rains. Adjacent habitat and wildlife in the vicinity of the access routes and the AML sites could be disturbed as well. Additional indirect and temporary impacts to wildlife during site access could include dust emission, fumes and noise.

In accordance with the CDCA Plan's Motorized Vehicle Access element, discussed in Section 3.1, the mitigation measures discussed in Section 4.1.2.1 would be implemented to minimize potential impacts to biological resources. With use of Best Management Practices (BMPs) and implementation of these measures, possible residual impacts would be anticipated to be minor.

4.2.2.2 Impacts Associated with Conducting Site Assessment

The AML site evaluation process includes a biological survey that would be conducted following NEPA standards. Before any actions are taken on a mine feature, the feature itself and the surrounding area would be evaluated by a biological resource specialist from the BLM Field Office. An external survey would be standard for all AML sites and internal surveys would be conducted where there is evidence of or reason to suspect wildlife use of the AML sites. The assessment, conducted by BLM's field personnel, contractors, or partners, in consultation with qualified biologists would include:

- Determining if the AML site is of value to wildlife populations, or provides habitat for special status species;
- Determining the presence of wetlands near the AML feature entrance;
- Determining access routes free of burrows, nests, and trails should off-road access be required;
- Flagging vegetative invasive species or species of concern for avoidance; and reducing or eliminating unnecessary wildlife mortality and habitat loss.

During the site assessment the BLM's field staff or contracted personnel would determine if remedial activities would impact threatened or endangered species present in the Mojave and Colorado Deserts. In the CDD, the BLM developed a programmatic approach covering mineral development projects of 10 acres or fewer. The USFWS rendered a biological opinion that allows BLM to mitigate these effects through a standard set of mitigating measures. Mine land remediation falls within the scope of this biological opinion. Therefore, remediation actions taken by the BLM of abandoned mine lands and associated features would be performed in compliance with existing protocols, except for those where a site-specific EA may be needed to address unique concerns.

Some of the mine features may occur in desert wildlife management areas (DWMA). Many of the closure activities may be subject to the small projects desert tortoise biological opinion issued by the USFWS (United States Department of the Interior Fish and Wildlife Service [DOI/FWS] 1997). Compliance with the terms and conditions of the biological opinion will reduce or avoid impacts to the threatened or endangered species in the area.

Acquiring even a basic understanding of bat use of AML mines often requires repeated surveys during different seasons. Sealing mines without first evaluating their importance to bats may be one of the single greatest threats to North American bats. Field personnel would conduct surveys and other activities at abandoned mine sites in consultation with qualified biologists experienced with bats and their use of mines. During the site visit, field personnel would conduct a preliminary evaluation to describe all mine openings and relevant information to

assess whether a particular site has the potential to provide bat habitat. External and when deemed necessary and feasible, internal surveys would be conducted to determine the presence of bat habitats. These surveys conducted in accordance with the steps outlined in Section 2.2.3.

Direct impacts to vegetation, wildlife, bats and threatened or endangered species during assessment activities would be minimal, as field personnel could avoid disturbing them. Indirect impacts associated with accessing the sites to conduct the surveys are discussed above. Potentially, trampling of vegetation could occur, but impacts associated with walking activities are presumed to be temporary and very minor.

4.2.2.3 Impacts Associated with Implementing Remediation Actions

Potential impacts to biological resources vary depending on the mine closure method selected and the biological resources present at the AML site.

Method I: Fences

Vegetation
No permanent impacts to vegetation would occur if the sites were fenced. Temporary impacts during construction of the fence would occur due to transportation to and from the sites and due to construction activities on site. Small areas of vegetation may have to be removed from mine areas to make room for the fence installation or to minimize the risk of igniting wildfires as a result of project activities such as cutting and welding. Seeds of invasive/nonnative species may be introduced and/or spread during activities such as daily travel to project areas. Equipment may also inadvertently transport seeds. If invasive/nonnative species become established, impacts to native plant communities in the area would reduce natural biodiversity and vegetation production. Invasive species spread would be mitigated by cleaning equipment and vehicles prior to site entry. Any residual impacts to vegetation that were not prevented would be mitigated by restoration of the area by the BLM after construction is complete.

Wildlife
There could be minor impacts to wildlife if the sites were fenced. Some areas previously used by animals could be no longer accessible after the fencing is installed. These areas are assumed to be very small and in the immediate vicinity of the mine entrance. Small wildlife would potentially still be able to enter the fenced area. Temporary impacts to wildlife would occur during construction of the fencing. These impacts would include general disturbance due to vehicular transportation to the site, increased noise in vicinity of the construction, potential disturbance of burrows or other nesting areas and disruption of small amounts of habitat near the fence line. Wildlife species would be expected to leave the area during the construction phase, and would return once the fence is installed.

Bats
There would not be any permanent impacts to bats under the fencing alternative. During construction, there would be temporary and minor impacts to bats. Bats are more active at night, and construction activities would take place during the day time. Therefore, direct impacts to bats would be minimal. However, bats can move roosting points if they become uncomfortable. It is possible that the construction noise during the day would cause the bats to abandon the mine roost. It is likely that they would return once fence construction is complete, and the noise disturbance is eliminated.

Threatened and Endangered Species
There would be no permanent impacts to threatened or endangered species other than those discussed above for all wildlife in the vicinity of the site. Pre-construction field surveys would have identified these species and their habitats prior to any physical disturbance of the area. If these species were found to be present, specific procedures and BMPs would be developed prior to the construction of a fence at the site to avoid or minimize impacts. For example, sensitive habitat could be flagged and avoided by construction personnel, and fence lines could be altered to ensure access to sensitive areas would continue.

Method II: Filling a Mine Feature

Backfill

Vegetation
As backfill operations would be anticipated to use existing, already disturbed material around the AML feature entrance, there would be no direct impacts to vegetation anticipated under the backfill alternative. Some vegetation may be disturbed through vehicle activities, though in the disturbed areas surrounding the mines, generally there are very low levels of existing vegetation. Indirect impacts associated with transporting fill materials through sensitive desert habitat (should this be necessary) would be similar to those discussed above for the access portion of the closure project.

Wildlife
Impacts to wildlife would occur under the backfill alternative if the animals actively used the mine as habitat. Potentially, many types of wildlife (bighorn sheep, wild horses, wild burros, desert tortoises and others) could use the mine, especially the entrance area, as shelter. Other wildlife such as owls or kangaroo rats may use the mine entrance as a habitat area. This sheltered area would be lost if the mine were to be backfilled. For species that only use this habitat temporarily this residual impact would be minor. For species that make a home in the mine, the potential impact may be more significant, particularly if they become trapped in the mine. Careful attention during the site assessment should detect the presence of wildlife near the mine entrance. Should such wildlife be detected steps for relocating the wildlife may be outlined in the Remediation Plan. If relocation is not possible and alternative exit routes are not available for the wildlife, it is likely this closure method would not be selected for that feature. Therefore, significant residual impacts to wildlife as a result of backfilling an AML feature are not anticipated.

Bats
If bats are living in the mine, impacts would occur if the backfill alternative was chosen. The result would be the complete loss of a roosting area. The presence of bats would have been determined during the assessment phase of the project. If bats were found to be present, it is presumed that this closure method would not be chosen. Therefore, impacts would be minimal.

Threatened and Endangered Species
Potential impacts to threatened or endangered species would be similar to those associated with other wildlife, and/or bats and owls, depending on the level of use of the mine.

Polyurethane Foam (PUF) Plug

Potential impacts to vegetation, wildlife, bats, owls, and threatened or endangered species under the polyurethane foam alternative would be similar to those associated with backfill.

Transportation impacts would be smaller, due to the need for less material on site. Minor additional impacts could occur due to the potential release of fumes into the open atmosphere during foam installation. These impacts associated with the release of fumes are expected to be very minimal.

Blasting

Potential impacts to vegetation, wildlife, bats and threatened or endangered species under the blasting alternative would be similar to those associated with backfill. Transportation impacts would be smaller, due to the need for less material on site. Additional impacts associated with the percussive noise of the explosions would occur. Extremely loud noises can cause permanent damage to sensitive species. It is anticipated that if this method were chosen, efforts would be made to ensure that most sensitive wildlife were removed from the immediate area prior to blasting. This could involve making noise and movements in the vicinity to chase animals away. If bats or threatened or endangered species were in the vicinity, they would have been discovered during the assessment phase, and appropriate avoidance measures would be adopted.

Method III: Installing Gates, Cupolas, Culverts and/or Grates

Vegetation
Impacts to vegetation under the gate alternative would be similar to those associated with fencing. Due to the fact that the gate would be installed directly into the mine entrance, these impacts would be minimal.

Wildlife
Impacts to wildlife under the gate alternative would be similar to those associated with fencing. Due to the fact that the gate would be installed directly into the mine entrance, these impacts may be slightly smaller.

Bats
This closure alternative would have the smallest impact to potential bat populations using the mine as a roosting site. Impacts to bats and owls associated with the gat alternative would be similar to those discussed above for the fencing option.

It is critical that existing airflow patterns be maintained when installing gates, cupolas, culverts and/or grates as bats are very sensitive to airflow conditions. When multiple mine openings are all used by bats, bat-compatible closures would allow continued airflow. However, these species often use a single opening and preserving airflow with more bat-compatible gates at other openings may not be financially justified. Airflow-preserving closures may be small, can use culvert stabilization, and can employ a variety of materials, such as expanded metal grills or heavy screens that allow airflow (BCI 2009).

Threatened and Endangered Species
Impacts to wildlife under the gate alternative would be similar to those associated with fencing. Due to the fact that the gate would be installed directly into the mine entrance, these impacts may be slightly smaller.

Mitigation Measures

For all remediation/closure methods, the following procedures would be used to mitigate potential impacts to wildlife at the AML site and along access routes to the site.

- Only biologists authorized by the USFWS, California Department of Fish and Game, and the BLM shall handle desert tortoises. However, all employees implementing the proposed action at a mine feature would have knowledge of the desert tortoise so that no taking of a desert tortoise would occur as a result of this activity. The following desert tortoise information should be known:
    - distribution of the desert tortoise
    - general behavior and ecology of the tortoise
    - sensitivity to human activities
    - legal protection
    - penalties for violation of State and Federal laws
    - reporting requirements
    - protective mitigation measures
- Workers would inspect for desert tortoises under vehicles prior to moving vehicles. If a desert tortoise is present, workers would preferably wait to move the vehicle until the tortoise has moved. Otherwise, the worker would carefully move the vehicle only when necessary and when the desert tortoise would not be injured by moving the vehicle.
- No dogs shall be allowed at a work site in desert tortoise habitat.
- All trash and food items would be promptly contained within raven-proof containers. These shall be regularly removed from the project site to reduce the attractiveness of the area to ravens and other desert tortoise predators.
- In the presence of known or potential wildlife habitat, steps would be taken to ensure no wildlife is destroyed as a direct result of closure activities. The BLM would include adequate biological resource exclusions as a routine part of mine remediation action to minimize the risk of entombing wildlife in closed workings. Further, closures would be conducted immediately following exclusion to limit the chances of wildlife becoming reestablished in the area to be closed. After dusk, a few days prior to the closure, a net-like material should be placed over the mine feature to prevent bats or owls from reentering the feature. The net-like material should be placed with an opening to allow any trapped bats or owls an exit. After a biologist determines that the mine feature is free from wildlife, it may be closed. For AML features showing wildlife use, consideration should be made to install a gate or cupola to allow the continued use of the mine feature by wildlife, rather than a fill closure.

With completion of the biological site surveys, and implementation of the various mitigation measures discussed above (and which would be included in the Remediation Plan on a site-specific basis), residual impacts to vegetation, wildlife, bats, and threatened and endangered species would be expected to be minor.

4.2.2.4 Project Closure and Monitoring

Appropriate monitoring efforts would be recommended during development of the Remediation Plan with respect to the remediation and closure method chosen for the AML sites. For biological resources, post-closure monitoring would include inspection of closure structures and the surrounding area for wildlife signs and monitoring for an increase in invasive nonnative plant species that may have resulted from project activities. Potential impacts to biological resources, including vegetation, wildlife, bats, and threatened or endangered species would be similar to those associated with the pre-remediation surveys and would be anticipated to be minor.

4.3 CULTURAL RESOURCES

4.3.1 Impacts Associated with the No Action Alternative

Under the No Action alternative, BLM would continue to follow management prescriptions in the CDCA Plan for meeting its responsibilities under the NHPA and its commitments under the Statewide Protocol Agreement with the California SHPO. Remediation actions that have the potential to adversely affect significant cultural resources would be reviewed in consultation with the California SHPO under Section 106 of the NHPA, as implemented in Statewide Protocol Agreement. Therefore, potential impacts to cultural resources under the no action alternative would be expected to be minimal.

4.3.2 Impacts Associated with the Proposed Actions

4.3.2.1 Impacts Associated with Determining Site Accessibility

All vehicle activities conducted with respect to the proposed actions would be in accordance with the guidelines described in Section 3.1. As discussed in Section 4.1.2.1, to the extent possible, access to mining sites shall utilize existing routes-of-travel designated “open” in land use plans. In these areas there would be no new impacts to cultural resources beyond those already present. In situations where vehicles must move from the open route of travel across limited routes or undisturbed land to access a mining feature, there is a potential for impacts to known and/or undiscovered cultural resources at or near the surface. Such impacts could include damage or destruction of all or a portion of the resource.

The treatment measures to mitigate potential impacts associated with vehicle access as discussed in Section 4.1.2.1 would apply to the protection of cultural resources. Specifically, to avoid or mitigate potential impacts to cultural resources, vehicle access would be restricted to existing routes to the extent possible. Should off-road access be required, cultural resource surveys would be conducted during the site assessment phase to delineate routes that would avoid or minimize potential impacts. As necessary, additional mitigation measures would be identified that may include documentation of and potentially recovery and removal of cultural resources when the resource value is significant and it is not possible to avoid potential impacts. Additionally, should borrow material be required to fill any depressions along existing routes prior to allow vehicle access, or to remediate vehicle tracks following completion of project activities, this material would be excavated from previously disturbed areas to avoid potential impacts to cultural resources. All site-specific mitigation measures would be outlined in the Remediation Plan. Therefore, residual impacts associated with site accessibility issues would be anticipated to be minor.

4.3.2.2 Impacts Associated with Conducting Site Assessments

The process of conducting field surveys would identify potential cultural resources in the project area and along proposed access routes. The site assessment would include a determination of the probable age of the mine with the goal of identifying mines greater than 50 years of age, which may be eligible for the NRHP. The evaluation team would use the results of these surveys to prepare the site-specific remediation and closure methods to be employed that would avoid or minimize to the extent possible, potential impacts to cultural resources. The evaluation team would finalize the site assessment process with completion of the appropriate compliance documentation with respect to Section 106 of the NHPA. As the site assessment process is an evaluation process primarily involving walking surveys and desktop activities, potential impacts to cultural resources would not be anticipated as a result of this phase of the proposed actions. Therefore, residual impacts associated with the site assessment would be anticipated to be beneficial, adding to the existing knowledge of the cultural heritage of the CDD.

4.3.2.3 Impacts Associated with Implementing Remediation Actions

Historic Resources

Historic properties may be affected by remediation activities associated with the closure of AML features. Historic properties are cultural resources (buildings, sites, structures, objects, or districts) that are either included in or eligible for inclusion in the NRHP. A property may be eligible for the NRHP because of its association with an important historic context and when it retains the integrity of those features necessary to convey its significance, including integrity in the location, design, setting, workmanship, materials, feeling, and contextual association.

Remediation actions at AML sites may affect significant historic properties by compromising the integrity or qualities and values of the features necessary for the property to convey its historic significance. For remediation actions, the effects most likely to be encountered would relate to integrity of setting, workmanship, materials, and feeling.

Significant mining properties or features may be affected by the physical installation of a remediation treatment or may be indirectly affected by changes to the contributing elements of the historic setting. Effects may include physical destruction of mine adits and shafts through backfilling or demolition with explosives. Physical effects would also include adding fences, PUF plugs, gates, cupolas, or culverts to seal existing historic mine features, or changing the landscape (setting) of a historic mine or feature in such a way to compromise the qualities and values that convey significance.

Every effort would be made to minimize impacts to the historic fabric and visual intrusions into historic mining landscapes with respect to implementation of the remediation and closure methods. For AML over 50 years of age, during preparation of the Remediation Plan, the evaluation team would recommend the remediation and closure method that would produce the least noticeable change or modification to the site. Whenever mine closure actions are considered at mine openings, steps would be taken to avoid or minimize impacts to any historic fabric that may still be in place, including the mine workings. Closure devices would ideally be worked into and around historic structures such that their visual presence is minimized to the extent possible.

In adit and tunnel portals (Appendix A), closure devices would be recessed to the extent possible given the stability of the portal and other safety factors. Culvert gates disguised with

natural materials may warrant consideration at an adit that has an unstable portal. Similarly, closure devices may be recessed into shaft openings unless wildlife or safety considerations preclude such an approach. In some cases the historic timbering may be removed, the device installed, and the timber replaced in its former position. In general, efforts would be taken to minimize the presence of closure devices and make them blend with the historic structures whenever such actions are financially feasible. In general, the intent would be to minimize the visual impacts of all remedies.

Prehistoric and Ethnographic Resources

Because the AML sites at which project activities would occur are historically disturbed areas, it is unlikely that undisturbed prehistoric resources are present. The presence of ethnographic resources would be determined during the site assessment process and the Remediation Plan would outline mitigation measures by which impacts to these resources could be avoided or minimized. Should significant resources such as prehistoric burials be discovered, project activities would cease until appropriate consultation could be conducted with the California SHPO and THPOs when appropriate. Mitigation measures to address these resources would be developed by BLM, the SHPO, and the THPOs when necessary and implemented before project activities recommence.

Mitigation Measures

All actions that have the potential to affect significant cultural resources would be reviewed in consultation with the California SHPO under Section 106 of the NHPA, as implemented in BLM Statewide Protocol Agreement. Under the proposed alternative, BLM would review all projects for effects to cultural resources on a case-by-case basis as part of NEPA and section 106 review at the time they are proposed. In addition to the treatment measures discussed above, the following mitigation measures would be implemented to minimize potential impacts to cultural resources:

- All BLM or contractor personnel performing abandoned mine site restoration actions would be educated to identify cultural resources.
- A cultural resources specialist would identify significant resources prior to activities on site and provide direction to the individuals performing the activities about how to avoid these resources
- Where appropriate, a cultural resources monitor would remain on site during activities to direct remediation activities near significant resources.
- Remediation actions would immediately cease if previously unrecorded sites, features or artifacts are discovered.
- Any historical or cultural artifacts discovered by the BLM employees or any person working on the BLM's behalf, on public or federal land shall be immediately reported to the BLM cultural specialist. The BLM or its contractors would suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the BLM. An evaluation of the discovery would be made by the BLM to determine the appropriate actions to follow to prevent the loss of significant cultural or scientific values.

Following implementation of all mitigation measures, there may be residual impacts to cultural resources from the alteration of the visual aspects of the historic features. Due to the attempts to integrate the closure methods and materials into the existing historic features these impacts

should be minor. Residual impacts to prehistoric and ethnographic resources are not anticipated.

4.3.2.4 Impacts Associated with Project Closure and Monitoring

Activities and impacts associated with project closure and monitoring would be similar to those discussed in Section 4.3.2.2. The mitigation measures outlined above and in Section 4.1.2.1 would apply during all stages of project activities in which motorized vehicles are employed. With the implementation of such mitigation measures, residual impacts associated with the project closure and monitoring process would not be anticipated.

4.4 MINERAL RESOURCES

4.4.1 Impacts Associated with the No Action Alternative

Under the No Action alternative, potential adverse impacts to mineral resources would be similar to those for the proposed actions. Currently AML closures are decided on an emergency, case-by-case basis. To the extent possible a determination is made regarding the future economic potential of the mine feature before a closure method is selected. Therefore, potential impacts to mineral resources are not anticipated.

4.4.2 Impacts Associated with the Proposed Actions

4.4.2.1 Impacts Associated with Determining Site Accessibility

All vehicle activities conducted with respect to the proposed actions would be in accordance with the guidelines described in Section 3.1. The majority of the mineral resources in the CDD are located below ground or within the AML features. Therefore, impacts associated with determining site accessibility with respect to mineral resources would not be anticipated as most vehicle traffic would be confined to existing routes. The presence of surface level mineral resources would be determined during the site assessment process, and should potential impacts with respect to site accessibility be determined, appropriate mitigation measures would be outlined in the Remediation Plan. Such mitigation measures may include those discussed in Section 4.1.2.1 as appropriate. With the implementation of such mitigation measures, residual impacts to mineral resources associated with the site accessibility process would not be anticipated.

4.4.2.2 Impacts Associated with Conducting Site Assessments

The majority of the mineral resources in the CDD are located below ground or within the AML features. The site assessment process primarily involves walking surveys of the AML feature and any off-route access pathways. Therefore, impacts associated with conducting site assessments with respect to mineral resources would not be anticipated. The site assessment would determine the presence of any surface level mineral resources, and the Remediation Plan would include any mitigation measures necessary to avoid or minimize impacts to these resources during implementation of the remediation actions. The site assessments would not evaluate the future mineral production possibilities for the AML features. Such a determination is beyond the scope of the proposed actions. With the implementation of any identified mitigation measures, residual impacts associated with the site assessment process would not be anticipated.

4.4.2.3 Impacts Associated with Implementing Remediation Actions

Implementation of certain closure methods would limit access to existing underground workings and, consequently, the mineral resources contained within these workings. Other closure methods would limit public access while retaining the potential for controlled, authorized access into the feature for new or on-going exploration and mineral development. Potential impacts with respect to mineral resources resulting from each possible closure method are as follows:

Method I: Fences

Minor impacts to mineral resources could occur immediately at the surface of the AML feature with respect to installation of fences. Such impacts would be greatest where the fence posts would be inserted into the ground or attached to AML walls. In these locations, any existing mineral resources would either be removed or destroyed. The total volume of mineral resources impacted in this way would be minor. The site assessment process would determine whether mineral resources are present in the area in which a fence would be installed and would recommend any appropriate mitigation measures to avoid or minimize potential impacts to these resources. Such mitigation measures may involve specifying locations for fence posts or installation points, or may include recommendations to remove certain resources before installation occurs. With implementation of such mitigation measures, the residual impacts resulting from removal or destruction of such resources would be anticipated to be minor.

Installation of fences around an AML feature opening would not preclude future access to the mineral resources contained within that feature. Fences do not permanently and irrevocably block access to the AML feature entrance. Therefore, no impacts to mineral resource accessibility are anticipated with respect to installation of fences for remediation and closure of AML features.

Method II: Filling a Mine Feature

The remediation and closure process of filling an AML feature is the most permanent closure method included in this process and therefore may potentially impact future recovery of mineral resources. The three methods for filling a mine each have minor differences in levels of impact with respect to future accessibility as discussed below.

Backfill

Backfilling a feature could limit future use of that feature for development of prospective mineral resources. While backfilling creates a barrier to AML features, it is not necessarily a permanent and irrevocable closure method. It would be possible to remove the fill material should future access to the AML feature be deemed desirable. As backfilling would create an inconvenience for future use of the feature, choice of backfilling as an option for these features should be carefully considered during development of the Remediation Plan. The choice of backfilling may, therefore, result in minor residual impacts to mineral resources.

Polyurethane Foam (PUF) Plug

Inserting a PUF plug limits future use of that feature for development of prospective mineral resources. The advantage of PUF plugs is that a small amount of material and the use of minimal amounts of equipment can seal large AML feature openings. While installing a PUF plug creates a substantial barrier to AML features, it is not necessarily a permanent and

irrevocable closure method. It would be possible to remove the fill material and plug should future access to the AML feature be deemed desirable. Because installation of a PUF plug restricts future access to the AML feature and mineral resources within, this closure method would most likely only be selected as a remediation and closure method where the need for future access is deemed unlikely. Use of a PUF plug may constitute minor residual impacts to mineral resources.

Blasting

Blasting a feature closed would limit future use of that feature for development of prospective mineral resources. Should future use of the mineral resources in that AML feature be deemed necessary, it is likely that a new access point would be required. Removing the blasted debris would not be recommended due to the likely destabilization of the AML feature from the original blast. This could increase the costs associated with mine development activities and thus produce an impediment to future development. Blasting should therefore be selected as a remediation and closure method where the need for future access is deemed unlikely. Blasting could, therefore, result in minor residual impacts to mineral resources.

Many AML sites contain multiple features, therefore, to retain the possibility of future access, a variety of closure methods may be selected on a feature specific-basis. This would be one potential mitigation measure that could be applied with respect to the mine filling closure method to minimize potential residual impacts that may occur from permanent closure of the AML site.

Method III: Installing Gates, Cupolas, Culverts and/or Grates

Minor impacts to mineral resources could occur immediately at the surface of the AML feature with respect to installation of gates, cupolas, culverts, and/or grates. Such impacts would be similar to those discussed for Method I: Fences above. Therefore, the mitigation measures would be similar as well. With implementation of such mitigation measures, the residual impacts resulting from removal or destruction of such resources would be anticipated to be minor with respect to installation of gates, cupolas, culverts, and/or grates.

Installation of gates, cupolas, culverts, and/or grates around an AML feature opening would not preclude future access to the mineral resources contained within that feature. These closure methods do not permanently and irrevocably block access to the AML feature entrance. Therefore, no impacts to mineral resource accessibility are anticipated with respect to installation of gates, cupolas, culverts, and/or grates for remediation and closure of AML features.

Mitigation Measures

During the development of the Remediation Plan, the evaluation team would consider the potential for future mineral resource development with respect to each AML feature. Potential for future use is determined in part through a determination of an existing active claim, presence of known mineral resources, or a previous BLM validity study. In the event an AML feature scheduled for closing has a significant potential for future development, the evaluation team would recommend a remediation and closure method that is appropriate for the anticipated future use of the AML mineral resource such that would be constructed in a manner that doesn't limit access to or availability of mineral resources. Features requiring remediation determined to have high potential for the occurrence of valuable mineral resources will be closed in such a manner that preserves access to underground resources while still achieving the project

purpose of eliminating public access to the hazard. Potential residual impacts to mineral resources could include beneficial impacts with respect to preservation of the resource as a result of sealing the mine, and adverse impacts associated with removing accessibility to these resources for scientific or economical purposes.

4.4.2.4 Impacts Associated with Project Closure and Monitoring

The majority of the mineral resources in the CDD are located below ground or within the AML features. The project closure and monitoring process primarily involves walking surveys of the AML feature and any off-route access pathways. Therefore, activities associated with conducting project closure and monitoring with respect to mineral resources would not be anticipated. Any implementation measures identified in the Remediation Plan that are applicable to project closure and monitoring would be implemented. Therefore, residual impacts associated with this stage of the remediation and closure process would not be anticipated.

4.5 PALEONTOLOGICAL RESOURCES

4.5.1 Impacts associated with the No Action Alternative

Under the No Action alternative, there would be potential adverse impacts to paleontological resources because under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Potential adverse impacts would vary by AML site depending on the nature of the paleontological resources in the area. Impacts could include destruction of undiscovered resources along off-route vehicle pathways or in or around the mine feature during closure activities. Given the scale of project activities, potential impacts to paleontological resources as a result of the no action alternative would be expected to be minor.

4.5.2 Impacts associated with the Proposed Actions

4.5.2.1 Impacts Associated with Determining Site Accessibility

All vehicle activities conducted with respect to the proposed actions would be in accordance with the guidelines described in Section 3.1. The majority of the paleontological resources in the CDD are located below ground. Therefore, impacts associated with determining site accessibility with respect to paleontological resources would not be anticipated as most vehicle traffic would be confined to existing routes. The presence of surface level paleontological resources would be determined during the site assessment process, and should potential impacts with respect to site accessibility be determined, appropriate mitigation measures would be outlined in the Remediation Plan. Such mitigation measures may include those discussed in Section 4.1.2.1 as appropriate. With the implementation of such mitigation measures, residual impacts associated with the site accessibility process would not be anticipated.

4.5.2.2 Impacts Associated with Conducting Site Assessments

The majority of the paleontological resources in the CDD are located below ground and/or within the AML features. The site assessment process primarily involves walking surveys of the AML feature and any off-route access pathways. Therefore, activities associated with conducting site assessments with respect to paleontological resources would not be anticipated. The site assessment would determine the presence of any surface level or in-mine paleontological resources and the Remediation Plan would include any mitigation measures necessary to avoid

or minimize impacts to these resources during implementation of the remediation actions. With the implementation of any identified mitigation measures, residual impacts associated with the site assessment process would not be anticipated.

4.5.2.3 Impacts Associated with Implementing Remediation Actions

While the original purpose for development and exploration of the mines was directed toward recovery of mineral resources, and while most mines are not located in fossil rich areas, it is possible that some AML features also contain paleontological resources. Implementation of certain closure methods (backfilling, PUF plug, and blasting) would significantly limit access to such resources. Other closure methods would limit public access while retaining the potential for controlled, authorized access into the feature for new or on-going exploration or recovery with respect to paleontological resources. Potential direct and indirect impacts, and mitigation measures, with respect to paleontological resources present in AML features resulting from the possible closure methods would be similar to those discussed in Section 4.4.2.3 for mineral resources. During the site assessment process, the potential for future development of paleontological resources within AML features would be considered during selection of the closure method. Potential residual impacts to paleontological resources could include beneficial impacts with respect to preservation of the resource from sealing the mine, and adverse impacts associated with removing accessibility to these resources for scientific or economical purposes, such impacts would be anticipated to be minor.

4.5.2.4 Impacts Associated with Project Closure and Monitoring

The majority of the paleontological resources in the CDD are located below ground and/or within the AML features. The project closure and monitoring process primarily involves walking surveys of the AML feature and any off-route access pathways. Therefore, impacts associated with conducting project closure and monitoring with respect to paleontological resources would not be anticipated. Any implementation measures identified in the Remediation Plan that are applicable to project closure and monitoring would be implemented and therefore, residual impacts associated with this stage of the remediation and closure process would not be anticipated.

4.6 SOILS

4.6.1 Impacts associated with the No Action Alternative

Under the No Action alternative, there would be potential adverse impacts to soils because under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Potential adverse impacts would vary by AML site. Impacts could include soil erosion as a result of off-route vehicle traffic or construction activities. Therefore, potential impacts to soils as a result of the no action alternative would be expected to be minor.

4.6.2 Impacts associated with the Proposed Actions

4.6.2.1 Impacts Associated with Determining Site Accessibility

All aspects of the proposed action require a certain amount of vehicle access and soil disturbance. Such disturbance may cause an increase in wind or water erosion due to direct soil mixing or destruction of vegetation holding soil in place.

The first step in the remediation and closure process would be to evaluate potential access routes to allow for the movement of equipment, construction materials, and personnel to reach the respective AML sites. Evaluation and selection of the access routes would be determined with consideration of the route designations as discussed in Section 3.1.

When transportation activities occur along dirt or gravel roadways, enhanced erosion could occur due to the soil disturbance when soil moisture levels are low as is frequently the case in the desert. Increased erosion could, if not mitigated, lead to destabilization of small features, loss of vegetation, and development of new storm water channels. Support vehicle use on the access routes and off-route could carry soils onto the paved roads presenting a driving impediment. A short-term increase in fugitive dust during wind storms could occur due to the soil disturbance as a result of the proposed actions

Once the action is complete at a site, vegetation would be reseeded where necessary and soil conditions should, with time, return to pre-disturbance stability. Mitigation measures proposed to help mitigate impacts to soils associated with vehicle accessibility are discussed in Section 4.1.2.1. Site-specific conditions would determine the degree to which these mitigation measures would be implemented.

Given the number of vehicles that would be used to access each individual site, individual site project durations of generally less than two days, and the overall size of the project area, and implementation of the suggested mitigation measures, impacts to soils associated with vehicle access during project activities would be anticipated to be minor and temporary. Following implementation of the mitigation measures, residual impacts to soils would not be anticipated in conjunction to vehicle access in association with the proposed actions.

4.6.2.2 Impacts Associated with Conducting Site Assessments

The second step in the CDD AML remediation and closure process would be to perform individual, site-specific site assessment including external and internal surveys (as appropriate), development of project recommendations, and completion of regulatory compliance documentation. Impacts to soils associated with employee activities during the external and internal surveys would not be anticipated as the surveys would primarily involve walking and photography activities. Minor dust mobilization may occur with foot traffic, but this would be insignificant with respect to overall soil resources in the area. Residual impacts to soils in association with the site assessments would not be anticipated.

4.6.2.3 Impacts Associated with Implementing Remediation Actions

Potential impacts to soil resources associated with the remediation and closure actions would vary depending on the closure method selected.

Method I: Fences

Minor impacts to soils could occur immediately at the surface of the AML feature with respect to installation of fences. Such impacts would be greatest where the fence posts would be inserted into the ground. In these locations, there would be minor soil disturbance though impacts would be temporary and minor.

Method II: Filling a Mine Feature (Backfill, PUF, or Blasting)

Backfill

The mine backfilling operation would generate small amounts of PM_{10} emissions as the heavy equipment moves borrow material into open mine features. Backfilling is likely to have an impact on in-situ soils due to the need for large equipment such as backhoes or earth movement equipment. Additionally, the placement of the borrow material, mine waste rock, earth, or other material into the mine would cause vertical mixing of the soils. This mixing would not be a significant impact as the mine waste rock soils are coarse, sandy, and poorly developed. In addition, much of the source materials to fill in the mines have already been mixed through the extraction process of mining. Direct, indirect, and residual impacts from the proposed action are expected to be negligible.

Polyurethane Foam (PUF) Plug

Minor impacts to soil resources may occur through the use of PUF to fill mine openings. The PUF plug is generally covered with loose borrow material, mine waste rock, or other natural material to protect the plug from fire, ultraviolet rays, and vandalism. Installation of this material would induce some vertical mixing and some mobilization of PM_{10} fugitive dust emissions. This mixing would not be a significant impact as the mine waste rock soils are coarse, sandy, and poorly developed. In addition, much of the source materials to fill in the mines have already been mixed through the extraction process of mining. Direct, indirect, and residual impacts from the proposed action are expected to be negligible.

Blasting

Blasting a mine opening shut would destroy the AML feature's surface expression. There may be some disturbance to soils in the area as a result of the blasting effects; however, these impacts would be anticipated to be temporary and minor.

Method III: Installing Gates, Cupolas, Culverts and/or Grates

Minor impacts to soils could occur immediately at the surface of the AML feature with respect to installation of gates, cupolas, culverts, and/or grates. Such impacts would be greatest where the fence posts would be inserted into the ground. In these locations, there would be minor soil disturbance though impacts would be temporary and minor.

4.6.2.4 Impacts Associated with Project Closure and Monitoring

With respect to these project closure and monitoring activities, minor soil resources impacts similar to those discussed above with respect to vehicle access and site assessments would be anticipated. Such impacts would be anticipated to be minor and temporary. When appropriate, similar mitigation measures as discussed in Sections 4.1.2.1 would be implemented.

4.7 WATER RESOURCES

4.7.1 Impacts associated with the No Action Alternative

Under the No Action alternative impacts to surface water or ground water would be similar to those discussed under the proposed action. Given the small number of water resources in the

area, and the small scale of the individual project activities, potential impacts would be expected to be minor.

4.7.2 Impacts associated with the Proposed Actions

4.7.2.1 Impacts Associated with Determining Site Accessibility

Impacts to water resources associated with determining site accessibility would be minor. Vehicles would primarily remain on open roads and therefore impacts to water resources would not occur. All vehicles would be inspected, as discussed in Section 4.1.2.1 prior to use to ensure the prevention of leaks or malfunction resulting in release of vehicle related chemicals. Therefore, potential impacts to water resources resulting from vehicles which do travel across or through water features or dry channels are not anticipated. Should off-road transit be necessary, the evaluation team would determine the best route that would avoid potential water resources. Where vehicles would transit an undisturbed environment, the area would be remediated following project activities erasing signs of vehicle activities, which would avoid or minimize any potential water related impacts from soil erosion or runoff.

4.7.2.2 Impacts Associated with Conducting Site Assessments

In most cases, site assessments would be performed on foot and not with vehicles; therefore there would be no expected impacts to water resources as a result of this action.

4.7.2.3 Impacts Associated with Implementing Remediation Actions

Potential impacts to water resources resulting from construction activities include runoff of soils from the project site during construction activities, and equipment malfunction that could result in a spill of mechanical fluids or fuels. Through the use of heavy equipment or the removal of some vegetation around the project site, minor soil runoff could occur under certain conditions. This would be a potential impact in areas where water resources are located near AML features. Such resources would be identified during the site assessment and the evaluation team would include recommendations in the Remediation Plan to address site-specific BMPs or mitigation measures that should be utilized to minimize the potential for adverse impacts to water resources as a result of construction activities.

Equipment malfunction and spills are considered to be very unlikely, as all vehicles are, as noted in Section 4.1.2.1, required to be inspected and in working order prior to initiation of project activities. Use of BMPs on the site should prevent project accidents. Should a spill occur, BLM would initiate clean up procedures in accordance with EPA and State of California regulations to minimize potential impacts to water resources and other environmental resources. A documented procedure to mitigate spillages if they occur will be required; including BMP's to minimize potential of spill reaching water resources.

Releases of any material not authorized shall be reported immediately to the Federal Interagency Communications Center (FICC) at 909-383-5652. An initial report shall be faxed to the authorized officer within 24 hours of the incident's discovery 760-326-7099. Incidents which occur during non-office hours must be faxed to the FICC concurrently at 909-383-5587. A comprehensive follow-up report must be received by the authorized officer within 14 calendar days of the incident's discovery.

Method I: Fences

As fences will not block the flow of water into or out of AML features, there would be no expected impacts to water resources as a result of installation of fences.

Method II: Filling a Mine Feature

The three methods of filling a mine feature are analyzed for impacts individually as follows:

Backfill

Backfilling an AML feature could potentially disrupt flow of water into or out of the feature, if such flow exists. Water flowing into a feature that is diverted in such a way could have impacts on the surrounding area due to development of a new pathway. This could cause increased erosion in the area potentially impacting various other resources. Additionally, impacts to water resources as a result of backfill could potentially include sediment runoff of backfill materials. During the site assessment process, the evaluation team should identify the presence of any water interchange systems between the AML feature and the surface. If such an interchange exists, drainage features can be constructed that would allow the water flow to continue while still performing the fill closure. Such drainage features could include culverts or smaller pipes allowing and inlet to the mine. Use of such drainage features would be stipulated in the Remediation Plan. Use of BMPs on the construction site would minimize and control runoff. With implementation of these mitigation measures, this closure method would not be anticipated to have impacts on water resources.

Polyurethane Foam (PUF) Plug

There would be a potential for adverse impacts to water resources through use of the PUF plug closure method if there are water resources in the immediate vicinity of the project site. As with backfilling, installation of a PUF plug could block water flow into and out of the AML feature. Use of drainage devices inserted into the plug could allow continued interchange between the mine and the surface. With implementation of these mitigation measures potential impacts to water flow should be minor.

Potential water quality impacts could occur if there were a polyurethane spill into any water bodies or channels. Use of BMPs during construction should minimize the potential for such spills. Should a spill occur, clean-up procedures would be implemented in accordance with EPA and State of California procedures as detailed in Section 4.7.2.3. Given the amount of polyurethane in use at any individual site, and the minor numbers of large and/or permanent water bodies in the CDD, potential impacts associated with such an accident should be minor.

There could be long-term impacts to water quality though use of the PUF plug closure method should the plug degrade over time and materials or debris from the plug leech into water sources in the area. The addition of backfill on top or in front of the plug would provide a measure of protection from fire, ultraviolet rays and vandalism. Regular inspections would be conducted as discussed in Section 2.2.6 to ensure the integrity of the plug and to watch for signs of damage. Therefore, potential long-term adverse impacts associated with the PUF plug are not anticipated.

Blasting

With the blasting remediation method, care would have to be taken if a water resource was within the blast radius; to be sure no foreign materials were propelled into the resource. Use of BMPs would minimize such potential impacts. Blasting could also fill the entrance of an AML feature and block potential water exchange between the surface and interior causing impacts similar to those discussed above for backfilling. Due to the nature of the blasting process, it would not be possible to include drainage features to allow continued water exchange. During the site assessment process, the evaluation team would determine if there is a possibility of water exchange. For cases where there is, it is likely this method would not be selected for the AML closure. Therefore, impacts to water resources in association with blasting are anticipated to be minor.

Method III: Installing Gates, Cupolas, Culverts and/or Grates

Installation of gates, cupolas, culverts, and/or grates would allow free flow of water in or out of the AML opening, therefore, no impacts to water resources are anticipated with these closure methods.

4.7.2.4 Impacts Associated with Project Closure and Monitoring

In general, no impacts to water resources are anticipated with the project closure and monitoring. Concerning the PUF plug, long-term monitoring (as discussed above) would be conducted during this stage to assure that the foam was not degrading and producing runoff that could potentially enter ground or surface water resources. For all three filling methods, the monitoring team would watch for signs of erosion and water diversions. If signs are identified, the monitoring team would develop recommended mitigation measures to resolve these impacts. Therefore, potential impacts to water resources associated with project closure and monitoring are anticipated to be beneficial.

4.8 NOISE AND VIBRATIONS

4.8.1 Impacts associated with the No Action Alternative

Under the No Action alternative, there would be potential adverse impacts to the noise environment because under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Potential adverse impacts would vary by AML site depending on the nature of the resources in the area, and the nature of the closure method implemented. Impacts could include damages to or displacement of wildlife from elevated noise levels, and disruption of recreational activities. Given the scale of project activities, potential noise related impacts to as a result of the no action alternative would be expected to be minor.

4.8.2 Impacts associated with the Proposed Actions

4.8.2.1 Impacts Associated with Determining Site Accessibility

During determination of vehicle access routes, the evaluation team would consider all applicable land use plans and existing regulations to determine the routes for which potential vehicle noise would have a minimal impact. Excessive noise could disrupt recreational activities or displace or damage wildlife resources. During vehicle activities the mitigation measures described in

Section 4.1.2.1 including restrictions on the speed limits at which vehicles can move would help minimize potential impacts.

4.8.2.2 Impacts Associated with Conducting Site Assessments

Site assessments would be done primarily on foot, therefore potential noise impacts associated with survey activities would not be significant. As discussed in Section 4.8.2.1 above, during the site assessment process, the biological survey team would identify any sensitive wildlife populations and include recommendations and mitigation measures in the Remediation Plan regarding potential noise impacts associated with construction activities. With the implementation of these measures it is anticipated with potential impacts to the noise environment would be minimized.

4.8.2.3 Impacts Associated with Implementing Remediation Actions

Motorized vehicles, heavy excavation equipment, including the associated attachments (such as the hydraulic chisel hammer), hand tools, and the gasoline powered concrete mixer used during construction activities would increase noise levels along travel routes and at the project site. Sound levels of the vehicles and construction activities would vary according to distance from the site and weather conditions, but could be expected to be in excess of 105 decibels at the site near the operating equipment and cause temporary displacement of wildlife and disrupt the solitude of the area.

Due to the low ambient noise levels in most of the CDD, wildlife may be more easily disturbed by excessive noise associated with mine closure activities and in most cases, the majority of the noise associated with these activities would be associated with vehicle noise. Due to the low ambient noise environment in the desert, wildlife can experience significant auditory system impacts from increased noise levels associated with OHV use (Schubert and Smith 2000). Most vehicle traffic associated with the remediation and closure process would be restricted to existing roadways where noise impacts would already be present to varying degrees. In areas where off-route travel occurs, the biological resources surveys conducted during the site assessment phase would identify the presence of any wildlife resources that could be adversely impacted by excessive noise. The evaluation team would include recommendations for equipment use and mitigation measures in the Remediation Plan.

Most projects would have construction durations of less than two days; therefore, noise impacts would be temporary. For the most part, wildlife in construction areas would be able to move away from the noise source for the duration of project activities.

The vehicles accessing the site will be expected to meet noise limits of 80 to 88 dbA depending on the gross vehicle weight rating and the year of manufacture in accordance with the California 2010 Vehicle Code, Division 12, Chapter 5, Article 2.5 Sections 27204, 2706, and 2707. All off-highway vehicles must meet noise limits of 82 to 92 dbA depending on the year of manufacture in accordance with Division 16.5, Chapter 6, Article 4, Section 38370 of the same code. Noise levels from the operation of heavy equipment range from 79 dbA for a loader to 88 dbA for a water truck (Giroux and Associates 2008). Although heavy equipment is not regulated under the 2010 Vehicle Code, operation of such equipment would fall within noise limits deemed acceptable for other vehicle usage.

To minimize potential adverse impacts associated with vehicle activities, as discussed in Section 4.1.2.1, vehicles would be inspected prior to project activities to ensure they are well

maintained and that noise emissions are within normal operating range. The mitigation measures discussed in Section 4.1.2.1 including limits on vehicle speeds would also help minimize potential impacts. In Wilderness and WSAs, vehicle traffic would be prohibited. Therefore, noise impacts would be associated with small equipment that can be transported by foot. Such impacts should be minor and would be temporary.

Overall, residual impacts associated with vehicle noise would be anticipated to be minor.

Method I: Fences

Fence construction should only produce minor and very temporary noise and vibration.

Method II: Filling a Mine Feature

Backfill

Earth moving equipment (backhoes, bulldozers, dump trucks) would perform the remediation, and minor noise and vibration impacts could result from the use of such equipment, but would be temporary and will not last past the actual fill process.

Polyurethane Foam (PUF) Plug

No significant noise or vibration impacts are expected from this method of remediation.

Blasting

This method would produce very short term but possibly extreme noise and vibration due to detonation of explosives. The vibration associated could possibly damage other antique mine features such as outbuildings and mining structures left on the site. If these structures are present and of concern, blasting would not be recommended as the preferred remediation method.

Method III: Installing Gates, Cupolas, Culverts and/or Grates

Minor and temporary noise or vibration impacts are expected with the installation of these structures. These impacts could possibly come from welding and impacting of the metal components used, as well as drilling associated with installation of hinges.

4.8.2.4 Impacts Associated with Project Closure and Monitoring

No significant noise and vibration impacts are expected with project closure and monitoring. Sounds from post-construction activities, such as non-routine maintenance, if needed, would be less than those associated with the construction phase. Routine maintenance would not create substantial noise levels. Monitoring inspections would be non-intrusive, as personnel would walk in to the site.

4.9 AIR QUALITY

4.9.1 Impacts associated with the No Action Alternative

Under the No Action alternative, there would be potential adverse impacts to air quality because under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Potential adverse impacts would vary by AML site depending on the nature of the resources in the area, and the nature of the closure method implemented. Impacts could include mobilization of fugitive dust (PM_{10}) and ozone emissions during project activities. Given the scale of project activities, potential noise related impacts to as a result of the no action alternative would be expected to be minor.

4.9.2 Impacts associated with the Proposed Actions

4.9.2.1 Impacts Associated with Determining Site Accessibility

Potential impacts to air quality in conjunction with transportation and accessibility needs would include fugitive dust and vehicle and equipment exhaust emissions. When transportation activities occur along dirt or gravel roadways, fugitive dust emissions could occur due to the soil disturbance when soil moisture levels are low as is frequently the case in the desert. Support vehicle use on the access routes and off-route could generate small amounts of PM_{10} emissions and could carry soils onto the paved roads, which would increase entrainment PM_{10} emissions. A short-term increase in fugitive dust during wind storms could occur due to the soil disturbance as a result of the proposed actions. Vehicle operations also result in the emission of carbon monoxide, oxides of nitrogen, and particulates. In addition, the equipment and support vehicles emit various precursor emissions for ozone. Ozone emission contributions would be minor due to the small number of vehicles operating at any location at any one time.

The proposed actions do not exceed the *de minimis* emission levels with respect to PM_{10}, carbon monoxide, nitrogen oxides, and precursor emissions for ozone. Therefore, the proposed actions are exempt from conformity determination (40 CFR Part 93.153 (iii)) as a continuing and recurring activity where activities would be similar in scope and operation to activities currently being conducted. As a result, no formal conformity analysis or determination is required. Once the action is complete at a site, conditions should, with time, return to pre-disturbance stability.

As all air quality impacts in this section are a result of vehicle access, implementation of the mitigation measures discussed in Section 4.1.2.1 would minimize potential impacts.

Given the number of vehicles that would be used to access each individual site, individual site project durations of generally less than two days, the overall size of the project area, and implementation of the suggested mitigation measures, actual emissions amounts from remediation activities would be anticipated to be minor and temporary. Therefore, no significant air quality impacts are anticipated in conjunction to vehicle access in association with the proposed actions.

4.9.2.2 Impacts Associated with Conducting Site Assessments

Site assessments would be done primarily by foot, but should vehicle access be required during the external and internal surveys, air quality impacts would be similar to those discussed in Section 4.9.2.1 and mitigation measures as described in Section 4.1.2.1 would be implemented as appropriate. Air quality impacts associated with employee activities during the external and

internal surveys would not be anticipated as the surveys would primarily involve walking and photography activities with which emissions would not be associated. Minor dust mobilization may occur with foot traffic, but this would be insignificant with respect to overall air quality in the area.

4.9.2.3 Impacts Associated with Implementing Remediation Actions

Potential air quality impacts associated with the remediation and closure actions would vary depending on the closure method selected.

Method I: Fences

Emissions generated during installation of fences would be limited to minor amounts of fumes and smoke from potential welding operations and minor amounts of PM_{10} emissions associated with digging of any post-holes to support the fence. It is anticipated that all of these potential emissions would be minor and therefore air quality impacts would not be expected.

Method II: Filling a Mine Feature (Backfill, PUF, or Blasting)

Backfill

The mine backfilling operation would generate small amounts of PM_{10} emissions as the heavy equipment moves soil into open mine features. These emissions would be temporary. Given the scale of the AML features likely to be filled, the duration of the project, and the existing conditions of the CDD air quality, potential impacts of backfill operations on air quality are not anticipated.

Polyurethane Foam (PUF) Plug

The use of PUF to fill mine openings could generate low levels of Volatile Organic Compounds (VOCs). The quantities used are minimal and are not expected to exceed *de minimis* emission levels. Backfilling materials over the plug would generate small amounts of PM_{10} emissions as the heavy equipment moves soil into open mine features. Such emissions would be temporary. Given the scale of the AML features likely to be filled, the duration of the project, and the existing conditions of the CDD air quality, potential impacts of PUF plug installation on air quality are not anticipated.

Blasting

Blasting a mine opening would generate minor to moderate amounts of PM_{10} emissions depending on the size of the explosion and the site specific conditions at the site of detonation. Such emissions would be temporary. Because blasting permanently destroys the AML feature's surface expression, blasting is not the preferred method of closure and would generally only be selected in cases where other remediation and closure methods are not possible and where there are no significant impacts to other resources. In general, air quality impacts associated with blasting would be temporary and would be anticipated to be minor.

Method III: Installing Gates, Cupolas, Culverts and/or Grates

Minor amounts of fumes and smoke could be generated from the welding process during construction of fences, gates, grates, culverts, and cupolas, but all of these emission levels would be small.

Mitigation Measures for Remediation Actions

For all remediation and closure methods, three mitigation measures would be implemented to minimize potential air quality impacts as a result of construction activities. The degree to which these mitigation measures would be implemented is based on site-specific conditions. The possible mitigation measures for air quality include:

- Curtail activities when wind speeds exceed 25 miles per hour.
- Reclaim any off-route access used during any construction process.

Based on the analysis of potential air quality impacts in association which each of the proposed remediation and closure methods and with implementation of the mitigation measures described above, overall potential air quality impacts are anticipated to be minor and temporary.

4.9.2.4 Impacts Associated with Project Closure and Monitoring

Project closure and monitoring involves implementation monitoring and effectiveness monitoring as defined in previous sections. With respect to these activities, minor air quality impacts similar to those discussed above with respect to vehicle access and site assessments would be anticipated. As discussed previously, emissions associated with these actions would be anticipated to be minor and temporary. When appropriate similar mitigation measures as discussed in Sections 4.1.2.1 would be implemented.

4.10 VISUAL RESOURCES

4.10.1 Impacts Associated with the No Action Alternative

Under the No Action alternative, there would be potential adverse impacts to visual resources because under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Potential adverse impacts would vary by AML site depending on the nature of the viewshed and aesthetics of the area. Impacts could include destruction of natural views or historic vistas through use of construction equipment and installation of closure structures. Given the scale of project activities, potential impacts to visual resources as a result of the no action alternative would be expected to be minor but could be more significant depending on the nature of the site.

4.10.2 Impacts Associated with the Proposed Actions

During the site assessment, a VRI would be performed, per the BLM Manual H-8410-1 to determine the site's Visual Resources classification. Each Visual Resources classification category includes specific guidance regarding the amount of visual impact allowed as a result of project activities. The classification would guide the decision-making process for the selection of the closure method. The evaluation team would include specific recommendations in the

Remediation Plan with respect to mitigation measures for reducing potential impacts to visual resources. These measures would be enacted during the construction activities.

Erecting signs in conjunction with any of the closure methods could impact visual resources, and the level of impact would depend on the class designation. BLM signs are designed to minimize visual impacts by balancing the use of natural colors with the use of reflectors and material to allow one to see the fence or other structure to avoid harm from impact. Signs would not be appropriate in Class I and possibly Class II areas.

4.10.2.1 Impacts Associated with Determining Site Accessibility

Whether vehicle use would be permitted in an area is in part determined by existing road and land use plans and in part by the classification during the VRI. Vehicles would not be allowed in Class I areas and possibly not in Class II areas.

Potential visual resources impacts associated with vehicle use would include creation of tracks in areas where none previously existed in the case of OHV use. These impacts would be minimized by implementation of the mitigation measures discussed in Section 4.1.2.1. Temporary impacts to the visual resources in the area would be caused by the presence of the vehicles themselves which are not a natural part of the landscape. As most construction activities should be completed in two days or less, these impacts would be minor.

4.10.2.2 Impacts Associated with Conducting Site Assessments

Since the site assessments would be conducted primarily on foot, there would be no anticipated impacts to visual resources, regardless of the class designation, during the site assessment process.

4.10.2.3 Impacts Associated with Implementing Remediation Actions

Method I: Fences

Because fences would represent a physical alteration of existing viewsheds they would not be appropriate for use in every VRI Class. Use of fences would potentially cause adverse impacts in Class I and II areas. Potential visual resources impacts associated with construction of fences could be mitigated by using materials that match the color of the surrounding landscape. Metal materials could be constructed of mild steel that would rust without compromising the structural integrity or use paint that is the color of the surrounding landscape.

Method II: Filling a Mine Feature

Filling a mine feature would be an appropriate closure method only for certain class designations. Under the VRI, an AML site may be classified as a visual resource due to the scenic nature of the site and/or for the cultural and historic setting. In these cases, filling the AML feature may cause significant impacts to the visual resources of the historic context. For AML sites with a classification based on the historic viewshed, backfilling would not be a recommended closure method.

For AML features where there are fewer or no historic considerations, filling the mine may return the site to a more natural appearance resulting in a beneficial impact to visual resources. In these cases, backfill materials at the feature expression would be designed to be at grade,

when practical, and constructed primarily of earthen materials alone or in conjunction with concrete and/or the PUF plug. For sites falling within this designation, impacts to visual resources in association with filling would be minor and beneficial.

Method III: Installing Gates, Cupolas, Culverts and/or Grates

Gates, cupolas, culverts, and/or grates could represent a physical alteration of existing viewsheds such that they would not be appropriate for use in every VRI class. During development of the Remediation Plan, the evaluation team would include recommendations to minimize the visual resources impacts associated with these closure methods. In some cases, it may be possible to inset these closure features in such a way that they are not immediately visible from the surrounding area. Other impacts associated with construction of gates and cupolas could be mitigated by using materials that match the color of the surrounding landscape. Metal materials could be constructed of mild steel that would rust without compromising the structural integrity or use paint that is the color of the surrounding landscape.

4.10.2.4 Impacts Associated with Project Closure and Monitoring

Post-closure monitoring would be conducted primarily on foot. During the monitoring process, the surveyors would check the condition of the closure materials and structures. Fences often require intensive maintenance and can be stolen or vandalized. Gates can also be vandalized and locks can be cut or pried open. Proper maintenance of the closure site is required to ensure the continued remediation of the public safety hazard. Maintenance of the site is also a concern with regard to the visual appearance of the site. Poorly maintained sites could have a minor adverse impact on the visual resources in the area. A maintenance plan would be recommended by the evaluation team as part of the Remediation Plan. Implementation of this maintenance plan would minimize potential adverse impacts to visual resources associated with long-term monitoring.

4.11 RECREATION

4.11.1 Impacts Associated with the No Action Alternative

Under the No Action alternative impacts to recreation would not occur as quickly because the mine features would not be remediated as quickly. Individuals and groups would continue to explore unsafe mine features, and experience risks to human health and safety. Potential impacts to recreation resources as a result of the emergency closure actions would be similar to impacts discussed for the proposed action.

4.11.2 Impacts associated with the Proposed Actions

4.11.2.1 Impacts Associated with Determining Site Accessibility

No impacts to recreation resources are anticipated in association with determination of site accessibility.

4.11.2.2 Impacts Associated with Conducting Site Assessments

No impacts to recreation resources are anticipated as a result of site assessments for most areas. In Wilderness or WSAs, it is estimated that a group of approximately six people would be concentrated between the wilderness boundary and the AML site for several hours during

the assessment phase and up to two days during the installation phase. In higher recreational use areas, such a group, even near the boundary might slightly reduce the quality of the primitive recreational experience of other visitors. To minimize potential impacts to recreation resources, site assessment and remediation actions would be scheduled to occur on weekdays when the number of visitors in the area would be reduced. Thus impacts to recreation resources would be temporary and minor. There would be no residual impacts to recreation as a result of conducting the site assessments.

4.11.2.3 Impacts Associated with Implementing Remediation Actions

Many individuals and groups enjoy exploring abandoned mine features. Although BLM discourages such activities and has tried to educate the public concerning the hazards of this type of recreation, it continues. Under the proposed action the hazardous mine features would be closed. These actions would restrict public access (recreational or otherwise) to the mine feature. The purpose for closing or restricting access to these features is to reduce the public safety hazards associated with people either exploring the abandoned mine feature for recreation or with people accidently encountering the abandoned mine feature. Implementation of the proposed action would improve human health and safety as it relates to recreation, though it would restrict a small selection of unapproved recreational activities. The elimination of these mine features would allow the public to have a safer recreational experience in these areas managed by the CDD, therefore, residual impacts to recreation are expected to be beneficial in terms of increased safety.

4.11.2.4 Impacts Associated with Project Closure and Monitoring

There are no impacts to recreation resources associated with project monitoring. Residual impacts would be beneficial because the site would be regularly maintained to ensure the continued safety of visitors to the area.

4.12 HAZARDOUS AND SOLID WASTES

4.12.1 Impacts Associated with the No Action Alternative

Under the No Action alternative, there would be potential adverse impacts with respect to hazardous and solid waste because under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Potential adverse impacts would vary by AML site depending on the nature of the resources in the area. Impacts could include debris left behind after completion of project activities or unresolved spills of oils, gases, fluids, lubricants, or other waste materials. Given the scale of project activities, potential impacts with respect to wastes would be expected to be minor.

4.12.2 Impacts Associated with the Proposed Actions

4.12.2.1 Impacts Associated with Determining Site Accessibility

Project vehicles contain fuel, oil, antifreeze, and other fluids, which would produce solid, hazardous, and special wastes in the event of a breakdowns or accident related release. As stated in Section 4.1.2.1, prior to mobilization on the site, all equipment would be inspected to be sure it is operating correctly and free of leaks before commencement of project activities. Equipment should be inspected daily to ensure that there are no discharges, and equipment maintenance activities should not be conducted on the site. Appropriate spill containment

material should be kept on site and should spills or releases occur they would be addressed in accordance with EPA and State of California regulations. All fuels and other materials used should be contained within the equipment or stored in appropriate containers. All materials should be removed from the site upon completion of construction activities.

Spillage of such fluids requires that the contaminated soil be treated as a waste according to the Environmental Protection Agency regulations. If spillage of fuel, oil, antifreeze or other fluids occurs in association with vehicle break downs or accidents, BLM would be responsible for cleanup activities. Releases of any material not authorized would be reported immediately to the Federal Interagency Communications Center (FICC) at 909-383-5652. An initial report would be faxed to the authorized officer within 24 hours of the incident's discovery 760-326-7099. Incidents which occur during non-office hours must be faxed to the FICC concurrently at 909-383-5587. A comprehensive follow-up report must be received by the authorized officer within 14 calendar days of the incident's discovery.

4.12.2.2 Impacts Associated with Conducting Site Assessments

Site assessments will be conducted primarily on foot. Survey teams would be expected to use BMPs and not dispose of any trash while in the field. Therefore, no hazardous or solid waste impacts would be anticipated with respect to site assessments.

4.12.2.3 Impacts Associated with Implementing Remediation Actions

Potential wastes associated with the remediation activities include vehicle spills or releases as discussed in Section 4.12.2.1 above and left over solid construction material waste. Materials from construction could include but not limited to pipe or bar cuttings and segments, wood fragments, small amounts of welding slag, and trash. Left-over materials and waste would be contained during construction activities and removed from the site and disposed of properly after the remediation is complete as part of site cleanup.

PUF is inert and non-reactive to acid mine drainage. However, some polyurethane includes flame retardants, which can, produce some toxic substances should the plug integrity deteriorate depending on the chemical content of the foam. When covered with fill, the mine opening would have a natural appearance and the plug would be protected from fire, ultraviolet light, and vandalism providing a level of protection from such degradation. To limit exposure during mixing of the compounds used to make the polyurethane plug, adequate ventilation, dust cartridge respirator, gloves, protective clothing and protective eyewear would be required. While mixing the liquid PUF, if contacted directly with the skin it is extremely difficult to remove. While one of the re-agents involved in making PUF contains a toxic substance, isocyanate, none of the components requires a Department of Transportation (DOT) "red tag" for shipping. Once combined, the isocyanate is complexed into a stable non-toxic form. The solid foam can be disposed of in a sanitary landfill without restriction. Therefore, with implementation of BMPs, no hazardous waste impacts are anticipated with this method of closure.

Providing BMPs are employed and appropriate cleanup measures are used, no residual effects as a result of un-mitigatable impacts with respect to hazardous and solid wastes are anticipated.

4.13 FIRE PROTECTION

4.13.1 Impacts Associated with the No Action Alternative

Under the No Action alternative, there would be potential adverse impacts associated with wildfires because under the current emergency closure process, there is only minimal attention directed toward avoiding, minimizing, or mitigating potential adverse impacts. Potential adverse impacts would vary by AML site depending on the nature of the physical and vegetation resources in the area. Impacts could include wildfires sparked by welding or cutting activities, or by vegetation contact with hot vehicle parts. Given the arid climate, dry conditions of vegetation, and old wood located around mine sites, potential wildfire impacts could be significant under the no action alternative.

4.13.2 Impacts Associated with the Proposed Actions

4.13.2.1 Impacts Associated with Determining Site Accessibility

Wildfires could potentially be sparked by dry brush coming in contact with hot vehicle parts, especially when vehicles are parked after extended periods of activity. During the site assessment, the evaluation team would analyze potential fire hazards associated with the project activities. In the Remediation Plan, the team would recommend areas where vehicles should park or brush should be removed to reduce the risk of fire ignition.

4.13.2.2 Impacts Associated with Conducting Site Assessments

Site assessments would be conducted mostly on foot, so fire risks are minimal. Survey teams would exercise care when parking vehicles to prevent fires resulting from hot components of the vehicles contacting dry brush. Survey teams would also exercise care with cigarettes and matches and not dispose of such materials in the field. Implementation of these BMPs would reduce the risk of wildfire in association with the site assessment process.

During the site assessment, the evaluation team would analyze potential fire hazards associated with the project activities. In the Remediation Plan, the team would recommend areas where brush should be removed to reduce the risk of fire ignition from hot vehicle parts or welding activities. A fire prevention section would be included in the Remediation Plan and approved by a fire prevention specialist for any remediation that utilized welding.

4.13.2.3 Impacts Associated with Implementing Remediation Actions

Most project activities would not create fire hazards with the exception of welding and potentially cutting. Welding produces hot metal off-fall and sparks that are potential ignition sources. Sparks can also be produced during cutting activities. In the arid climate of the CDD, these sources of ignition can spark wildfires if they contact any ignitable materials such as vegetation, lumber, etc. For the closure methods that would employ cutting or welding operations, before site activities begin a person would be designated as the “fire watch.” The fire watch would be responsible for re-wetting vegetation surrounding the work site for ongoing fire prevention during cutting and welding activities and for ensuring that the fire prevention plan in the Remediation Plan is followed. The fire prevention plan would be approved by a fire prevention specialist for any remediation that utilized welding before project construction begins. To the extent possible welding would be done in a clear area where fire outbreak can be monitored and prevented.

With the use of the fire prevention plan and employment of BMPs, potential residual impacts associated with fire hazards should be minor.

Blasting involves explosive materials, and the potential for a fire, secondary to detonation is small but does exist. Care must be taken to monitor any debris for ignition. Potential impacts associated with fire hazards as a result of blasting are not anticipated.

The reaction that creates the polyurethane foam is exothermic, and could present a heat source for ignition. However, the engineering specifications for the PUF (Appendix E) limit the thermal output of the reaction to prevent fire hazards. Therefore, no significant impacts are expected from a PUF installation.

With implementation of the fire prevention plan and BMPs the potential risks of wildfires should be minimized. Under most circumstances there should be no residual impacts. Should a wildfire occur despite implementation of these mitigation measures, there would be residual impacts in the burn area. Depending on the nature of the site pre-burn, recovery following a wildfire would take several years. In the case of fire, BLM could assist the area in recovery through reseeding, though this would only be practical for a small burn.

4.14 DESIGNATED SPECIAL USE AREAS

4.14.1 Impacts Associated with the No Action Alternative

Mine closure remediation is currently not performed in Wilderness areas or WSAs. Therefore, under the no action alternative wilderness values of naturalness would continue to degrade because open shafts that are not remediated present an obvious imprint of man. Because there would be no human presence associated with inspection of remediation of AML/hazards, no adverse impact on wilderness values would occur as a result inspections. The health and human safety exposure to Wilderness or WSA users would continue at current levels presenting ongoing adverse impacts.

4.14.2 Impacts Associated with the Proposed Action

The three wilderness characteristics for which consequences are analyzed with respect to Wilderness and WSAs are naturalness, opportunities for solitude, and/or opportunities for primitive recreation.

4.14.2.1 Impacts Associated with Determining Site Accessibility

Vehicle use is prohibited in Wilderness areas, therefore all project activities would be conducted on foot from the nearest road for AML features located in these areas. Though managed for the same values as wilderness areas, WSAs are under a different statutory standard known as the non-impairment standard. Therefore, the analysis of consequences on wilderness values in WSAs is similar to that for wilderness, with two qualitative differences. Vehicle use for inspection and remediation of hazards can be utilized if necessary. The need for vehicle and equipment use would be considered by the evaluation team during preparation of the Remediation Plan. Vehicle use would only be permissible where no new surface disturbance would occur, including to vegetation. As such, vehicle use would not occur off of and may not occur on some vehicle ways in WSAs. This would help minimize impacts to these areas.

Potential impacts to Wilderness and WSAs in conjunction with access activities would be anticipated to be minor and temporary with adherence to the guidelines, and, in areas where vehicle use is permitted, the mitigation measures discussed in Section 4.1.2.1 would be implemented. With implementation of these mitigation measures, residual impacts to Wilderness and WSAs would not be anticipated.

All access into ACECs would be in accordance with routes of travel designation developed in the ACEC plan. If no ACEC plan has been developed, access will be in accordance with the existing land use plan. Impacts are expected to be minor and associated with minor soil, vegetation, and air quality disturbances as discussed in the sections above. With implementation of the mitigation measures discussed in Section 4.1.2.1, these impacts would be minimized and residual impacts would not be anticipated.

4.14.2.2 Impacts Associated with Conducting Site Assessments

For purposes of analysis, most AML sites remediated and closed under this process would include those portions of wilderness with high visitor use. Most of these would be relatively close to wilderness boundaries. As a result, any compaction of vegetation or surface disturbance associated with access is expected to be less than ¼ mile in length and not apparent to the typical visitor. While unlikely, any foot paths established that are conspicuous might entice motorcycle or other OHV use into wilderness from the boundary. Therefore, following completion of AML closure activities, any evidence of foot traffic would be remediated by smoothing soils through raking or brooming, or restoring vegetation as appropriate.

4.14.2.3 Impacts Associated with Implementing Remediation Actions

Because vehicle use is prohibited in Wildlife areas, the selected closure methods would have to be emplaced by hand. All equipment and supplies required would need to be carried in by foot. This requirement in conjunction with the requirements for preservation in these areas would suggest the use of plugs or gates with minor backfill would be the recommended approach.

In Desert Wildlife Management Areas, use of heavy equipment would be possible for backfilling operations if such can be done without creating new surface disturbances. If not, then the use of plugs or gates with minor backfill would be the recommended approach.

4.14.2.4 Impacts Associated with Project Closure and Monitoring

Impacts during project monitoring would be the same as those discussed under site access.

5.0 CONSULTATION AND COORDINATION

This chapter provides information on those individuals, groups, and agencies that provided input into the development of this PEA. The following were consulted during the writing of the PEA:

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6.0 REFERENCES

About.com. 2010. Noise Restrictions & Sound Decibel Ratings For ATVs To Avoid A Ticket. Accessed on July 15, 2010 at http://4wheeldrive.about.com/od/noisecontrolatv/Noise_Restrictions_Sound_Decibel_Ratings_For_ATVs_To_Avoid_A_Ticket.htm.

Altenbach, J. S., R. Sherwin, and P. Brown. Pre-mine closure bat survey and inventory techniques in Bat Conservation and Mining: A technical interactive forum. Eds: Vories, Kimery, V. and D. Throgmorton. St. Louis: November 2000, pp 115-125.

American Geological Institute, 1997. Dictionary of Mining, Mineral, and Related Terms, 2nd Edition.

BCI, 2009. Managing Abandoned Mines For Bats. Authors: Richard E. Sherwin, Christopher Newport University; J. Scott Altenbach, University of New Mexico; David L. Waldien, Bat Conservation International.

Bat Conservation Trust, 2008. Bat Roosts. Accessed on July 14, 2010 at http://www.bats.org.uk/pages/bat_roosts.html.

Bureau of Land Management (BLM), February 1980. Desert Fever: An Overview of Mining History of the California Desert Conservation Area. Prepared by: GL Shumway, L Vredenburgh, R Hartill. U.S. Department of Interior. Available at http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/cdd/aml.Par.54155.File.dat/Desert%20Fever%20-%20History%20of%20Mining%20in%20the%20CDCA.pdf.

BLM, 1980. The California Desert Conservation Area Plan, as Amended. U.S. Department of Interior. Available at http://www.blm.gov/pgdata/etc/medialib//blm/ca/pdf/pdfs/cdd_pdfs.Par.aa6ec747.File.pdf/CA_Desert_.pdf/.

BLM, 1994. South Coast Regional Management Plan and Record of Decision. U.S. Department of the Interior. Available at http://www.blm.gov/ca/st/en/fo/palmsprings/sc_rmp.html.

BLM, January 2001. Draft Environmental Impact Statement, Draft California Desert Conservation Area Plan Amendments for the Northern and Eastern Mojave Planning Area. California Desert District, U.S. Department of Interior. Available at http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pdfs/old_pdfserver/nemodraft.Par.485e3fa7.File.pdf/0.0_Introduction.pdf.

BLM, July 2002. Proposed Northern & Eastern Colorado Desert Coordinated Management Plan, an amendment to the California Desert Conservation Area Plan 1980 and Sikes Act Plan with the California Department of Fish and Game and Final Environmental Impact Statement. California Desert District and California Department of Fish and Game Inland, Deserts, and Eastern Sierra Region, U.S. Department of Interior. Available at http://www.blm.gov/ca/news/pdfs/nemo2002/.

BLM, March 20, 2007. H-3720-1 Abandoned Mine Land Program Policy Handbook. U.S. Department of Interior. Available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.14160.File.dat/h3720-1.pdf.

BLM, October 2008. Eastern San Diego County Resource Management Plan and Record of Decision. U.S. Department of the Interior. Available at http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/elcentro/planning/2007/fesdrmp.Par.29969.File.dat/ESDC_RMP26ROD.pdf.

BLM 2010a. California Desert District's Abandoned Mine Lands. U.S. Department of the Interior. Available at http://www.blm.gov/ca/st/en/fo/cdd/abandonedmineland.html.

BLM, 2010b. Wild Horse & Burro Program. U.S. Department of the Interior. Available at http://www.blm.gov/ca/st/en/prog/wild_horse_and_burro.html.

BLM 2008. National Environmental Policy Act Handbook H-1790-1. U.S. Department of the Interior. Available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.24487.File.dat/h1790-1-2008-1.pdf.

BLM. Visual Resource Management Handbook H-8400-1. U.S. Department of the Interior. Available at http://www.blm.gov/nstc/VRM/8400.html.

BLM. Manual H-8410-1, Visual Resource Inventory, U.S. Department of the Interior. Available at http://www.blm.gov/nstc/VRM/8410.html.

BLM, 2010. Herd Areas and Herd Management Areas. U.S. Department of the Interior. Available at http://www.blm.gov/ca/st/en/prog/wild_horse_and_burro/hma-main.html.

BLM, 2010. About the California Desert District. U.S. Department of the Interior. Available at http://www.blm.gov/ca/st/en/fo/cdd/about_cdd.html.

BLM, 2009. BLM Announces Public Scoping for Abandoned Mine Lands Programmatic Environmental Assessment. U.S. Department of the Interior. Available at http://www.blm.gov/ca/st/en/info/newsroom/2009/april/CDD0941_AML_PEA.html.

California Air Resources Board (CARB), 2010. California Air Basins. Available at http://www.arb.ca.gov/ei/maps/statemap/abmap.htm.

California Department of Conservation, Office of Mine Reclamation, Abandoned Mine Lands Unity. California Abandoned Mines: A Report on the Magnitude and Scope of the Issue in the State. Volume 1. Available at http://www.scribd.com/doc/6137006/v1-ca-aml-report.

California Department of Fish and Game's California's Wildlife Action Plan, 2007. Available at www.dfg.ca.gov/habitats/wdp.

California Department of Forestry and Fire Protection. 2008 Fire Summary. Available at http://www.fire.ca.gov/downloads/redbooks/2008/02-wildland-statistic-all-agencies/11-2008-FIRE-SUMMARY.pdf.

California Department of Transportation, 2008. A Historical Context & Archeological Research Design for Mining Properties in California. Available at http://www.dot.ca.gov/ser/guidance.htm#mining_study.

California Environmental Protection Agency (CEPA). 2006. Abandoned Mine Land Site Discovery Process. June 30, 2006. Prepared for the US Environmental Protection Agency Region 9. Accessed on July 14, 2010 at http://webcache.googleusercontent.com/search?q=cache:gs2JODl9AlAJ:www.dtsc.ca.gov/SiteCleanup/Brownfields/upload/SMBRP_AML_Guidance.pdf+abandoned+mines+waste+california&cd=2&hl=en&ct=clnk&gl=us.

California Geological Survey. 2010. Mineral Resources. Accessed on July 14, 2010 at http://www.consrv.ca.gov/cgs/geologic_resources/mineral_resource_mapping/Pages/index.asp.

California Highway Patrol (CHP). 2010. CHP Bulletin NO.98-100: Exhaust Noise and the Law of California, USA. Accessed on July 15, 2010 at http://www.cent-21.com/laws/exhaust-us.htm.

California Native Plant Society, 2001. Inventory of Rare and Endangered Plants of California, Special Publication #1, Sixth Edition. CNPS, Sacramento, CA.

California Watchable Wildlife. 2010. Where to Watch. Accessed on July 15, 2010 at http://www.cawatchablewildlife.org/camap.php.

Exploring the Southwest Desert USA. 2010. Off-Highway Vehicle Areas, BLM Areas in the California Desert District. Accessed on July 15, 2010 at http://www.desertusa.com/OHV/du_ohv_blm.html.

Giroux and Associates. 2008. Noise Impact Analysis, Azusa Rock Revised Cup Application, prepared for Vulcan Materials Co., September 22, 2008.

Natureserve Explorer. 2010. Least Bell's Vireo *Vireo bellii pusillus.* Available athttp://www.natureserve.org/explorer/.

Office of the Inspector General (OIG). 2007. Abandoned Mine Lands in the Department of the Interior" (C-IN-MOA-004-2007).

Pulido-Velazquez, M., M. W. Jenkins, and J. R. Lund. 2004, Economic values for conjunctive use and water banking in southern California, *Water Resources Research*, *40.*

Schubert, D.J. and J.Smith 2000. The Impacts of Off-Road Vehicle Noise on Wildlife. Wildlands CPR he Road- RIPorter. Jan/Feb 2000, Volume 5 #1. Available at http://www.wildlandscpr.org/biblio-notes/impacts-off-road-vehicle-noise-wildlife.

Sigal, L.L. and J.W.Webb. 1989. The Programmatic Environmental Impact Statement: Its Purpose and Use. The Environmental Professional 11: 14-24.

Trout Unlimited. 2010. Abandoned Mine Impacts. Accessed on July 14, 2010 at http://www.tu.org/conservation/abandoned-mines-western-us/abandoned-mine-impacts.

United States Fish and Wildlife (USFWS). 1994. Desert Tortoise (Mohave Population) Recovery Plan.

USFWS. 2010a. Species Account Least Bell's Vireo. Sacramento Fish and Wildlife Office. Available at http://www.fws.gov/sacramento/es/animal_spp_acct/LB_vireo_kf.htm.

USFWS. 2010b. Species Profile Palm Springs round-tail ground squirrel. Accessed at http://www.fws.gov/ecos/ajax/speciesProfile/profile/speciesProfile.action?spcode=A0EI on 15 June 2010.

USFWS 1989. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Mohave Population of the Desert Tortoise.

USFWS 1998a. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants; Endangered Status for the Peninsular Ranges Population Segment of the Desert Bighorn Sheep in Southern California. Available at http://www.fws.gov/ecos/ajax/speciesProfile/profile/speciesProfile.action?spcode=A0DR.

USFWS 1998b. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants; Final Rule to List the San Bernardino Kangaroo Rat as Endangered. Available at http://www.fws.gov/ecos/ajax/speciesProfile/profile/speciesProfile.action?spcode=A0G8.

USFWS 2004. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants; 90-Day Finding on Petition To Delist the Stephens' Kangaroo Rat and Initiation of a 5-Year Review. Available at http://www.fws.gov/ecos/ajax/speciesProfile/profile/speciesProfile.action?spcode=A0G8.

USFWS 2005. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates or Proposed for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions; Proposed Rule.

United States Geological Survey. 2010. California Coastal Basin Aquifer. Available at http://water.usgs.gov/ogw/aquiferbasics/calcobaq.html.

United States Department of the Interior Fish and Wildlife Service (DOI/FWS). 1997. Biological Opinion for Small Projects Affecting Desert Tortoise Habitat in Imperial, Inyo, Kern, Los Angeles, Riverside, and San Bernardino Counties, California. 6840 CA-063.50. 1-8-97-F-17.
Watchable Wildlife, Inc. 2010. About Us. Accessed on July 15, 2010 at http://www.watchablewildlife.org/about/default.htm.

Wisdom, Sheyna. 2008. Assessing noise impacts on wildlife under the National Environmental Policy Act. J. Acoust. Soc. Am. Volume 124, Issue 4, pp. 2449-2449 (October 2008).